File: 1514-05(A) NEFMC Atlantic Herring FMP

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

SEP 17 1999

MEMORANDUM TO: Gary C. Matlock
Director, Office of Sustainable Fisheries

FROM: Donald R. Knowles Don Knowles
Director, Office of Protected Resources

SUBJECT: ESA Section 7 Consultation on Federal Atlantic Herring Fishery Management Plan

The attached biological opinion addresses the potential effects of the Federal Atlantic herring fishery management plan under the Magnuson-Stevens Fishery Conservation and Management Act on threatened and endangered species, pursuant to section 7 of the Endangered Species Act of 1973, as amended (ESA). This opinion concludes that the proposed federal herring fishery is not likely to jeopardize the continued existence of threatened or endangered species or designated critical habitat. The biological opinion includes an Incidental Take Statement that provides the fishery with an exemption to the take prohibitions established in section 9 of the ESA.

The data available on the effects of the Atlantic herring fishery on threatened and endangered species were limited. However, the Northeast Fisheries Science Center is currently conducting a comprehensive bycatch analysis that is expected to be available by the end of calendar year 1999. In addition to the information on bycatch, this analysis will also represent an important source of information on the distribution of sea turtles in the action area. The Biological Opinion recognizes that this report may constitute new information that reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this Biological Opinion. However, based on discussions of preliminary results of this analysis, we expect this report to contain significant new information that will require our two offices to reinitiate section 7 consultation on several fisheries, including the Atlantic Herring Fishery. We also expect the new information to require us to determine

whether an observer program is necessary and appropriate for the Atlantic herring fishery.

For further information, please contact Kim Thounhurst at (978) 281-9138 or Craig Johnson at (301) 713-1401.

Attachment

ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

BIOLOGICAL OPINION

Agency: National Marine Fisheries Service

Activity: Consultation Regarding the Federal Atlantic Herring Fishery

Conducted by: National Marine Fisheries Service
Northeast Regional Office

Date Issued: SEP 17 1999

INTRODUCTION

The New England Fishery Management Council (NEFMC) submitted the Atlantic Herring Fishery Management Plan (FMP) and supporting Environmental Impact Statement (EIS) for approval on March 8, 1999. The FMP was prepared pursuant to Section 314(c) of the Magnuson-Stevens Act (MSA), which directs the regional fishery management councils to develop FMPs for underutilized species. The National Marine Fisheries Service (NMFS) intends to publish a proposed rule for implementation of this plan under the MSA. The primary geographic area affected by the FMP includes northeast and mid-Atlantic waters of the United States Exclusive Economic Zone (EEZ). In addition, territorial waters of northeast and mid-Atlantic states are affected through the regulation of activities of federal permit holders fishing in those areas.

This Biological Opinion is based on information provided in the EIS, the proposed rule, and other sources as noted. The administrative record for this consultation is on file in the NMFS Northeast Regional Office, Protected Resources and Sustainable Fisheries Divisions in Gloucester, Massachusetts.

CONSULTATION HISTORY

An informal consultation on a preliminary management plan (PMP) for Atlantic herring was completed on June 22, 1995, with an amendment issued July 3, 1995. This consultation concluded that the fishing activity conducted under the PMP was not likely to adversely affect listed species or critical habitat. The midwater trawl sector of the herring fishery was indirectly addressed in an informal consultation, completed November 19, 1997, on Framework Adjustment 18 to the Northeast Multispecies FMP. This consultation concluded that the re-authorization of the midwater trawl fishery for herring and mackerel in the multispecies closed areas did not change the basis of previous consultations on the Multispecies FMP and deferred discussion of the effects of the herring fishery and the mackerel fishery to the upcoming consultations on those respective FMPs.

DESCRIPTION OF THE PROPOSED ACTION

The new federal Atlantic herring[1] FMP was developed through a state-federal planning process initiated in 1996. The FMP will implement a comprehensive framework for management of the federal herring fishery, establish parameters for monitoring the fishery relative to the overfishing definition process, and encourage the development of the offshore fishery. The prosecution of the Atlantic herring fishery in state waters by fishing vessels holding only state permits is regulated by the Atlantic States Marine Fisheries Commission (ASMFC) herring plan, which is described in the Environmental Baseline section. This consultation considers the federal herring fishery as a whole in addition to the proposed management measures for its regulation.

A. Description of the Current Fishery for Atlantic Herring

A commercial fishery for herring has existed at various levels in the action area since colonial times and has fluctuated greatly with changes in market demand and with the collapse of various stock components resulting from the period of over-exploitation in the 1960s and 1970s. A detailed history of the fishery is contained in the EIS (NEFMC 1999). Products of the herring industry include roe, scales, whole fish, and whole fish products such as "sardines" and "steaks". Although the sardine industry generated the primary market for herring from the domestic fishery during most of the twentieth century, the principal market for herring caught in recent years supplies bait for the lobster pot industry, one of the largest commercial fisheries in the action area. The sardine industry generally prefers juvenile (Age 2) fish. Since 1986, however, 75% of the landings were comprised of adult herring of Age 3 or older.

Although some herring is still harvested in state waters, the majority of the current harvest comes from federal waters. While the resource remains under-exploited, there is potential for increased effort in the EEZ. In general, the fishery follows the northerly migration of the herring resource. From December-March, the fishery operates in the coastal waters of southern New England. Spring fishing is primarily in areas of the Gulf of Maine such as Jeffreys Ledge. In late summer and/or early fall, most fishing is in the coastal waters of Maine, New Hampshire, Massachusetts, Georges Bank, and an area east of Nantucket Shoals. Late fall fishing effort is concentrated in southern New England. In 1997, herring were caught in some portion of the Gulf of Maine throughout most of the year.

The herring fishery consists of several different types of operations. Harvest of herring in the U.S. EEZ is currently only permitted for domestic vessels. Some of these vessels also conduct their own processing by chilling or freezing products at sea. Other vessels transfer the catch at sea to foreign processing vessels. These operations are either classified as joint venture processing (JVP) if the processor is stationed in the EEZ or as internal waters processing (IWP) if the processor is operating in state waters. Other vessels may transfer catch to shoreside

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[1] "Atlantic Herring", *Clupea harengus harengus*, is also commonly known as "sea herring". Although "river herring" species are found in the ocean, occasionally in association with Atlantic herring, the fisheries for these species are managed by the ASMFC and are not included in this consultation.

domestic processors. Unlike the codend transfer process which was typical for the joint venture mackerel trawl fleet historically, transfer of herring in the current fishery is primarily done via pump-out operations.

Most vessels that catch herring do not land, *i.e.*, keep and sell, the catch. Rather, most of the herring that is caught incidental to other fisheries is discarded. The number of vessels that discard herring is unknown. In 1996, at least 279 vessels landed some herring in the Northeast, with approximately 60 landing only herring. In 1997, nearly 98% of reported landings were caught by 21 vessels, while more than 185 other vessels reported some landings. The directed fishery for herring currently consists of approximately 21 vessels, and there is a potential for additional entrants into the fishery due to the state of the herring resource relative to over-exploited stocks of traditional target species. Additional part-time participants in the directed fishery include squid freezer-trawlers that switch to herring once the squid quota is reached. This category of vessels may expand as markets are developed since herring can be caught as a "filler" between the squid and mackerel seasons. The EIS discusses the potential for additional vessels currently participating in the mackerel (15 midwater trawlers) and menhaden (8 purse seiners) fisheries to enter the herring fishery due to the similarity in vessel characteristics. The fishery is expected to expand in the future, particularly with regard to an increase in effort on Georges Bank. The expansion will, however, be limited by the proximity of processing capability and market and by the value of herring products. Because of the current low market value of herring, any expansion that does occur is not expected to be rapid.

The primary gear types used in the herring fishery are mobile gear types including midwater trawl gear, paired midwater trawls, and purse seines. Some vessels alternate gear types. Weirs, stop seines, pound nets, bottom trawl gear, sink gillnets, and drift gillnets have also been used historically to target herring to some extent. There are several other types of gear that catch herring, including paired bottom trawls, bottom longlines, scallop dredges, shrimp trawls, and lobster pots, although these catches are considered to be incidental to other fisheries rather than the result of targeting on herring. NMFS recently published a list of fisheries and allowable gear types under the Magnuson-Stevens Act (64 FR 4030). That list only authorizes the use of trawl, purse seine, and gillnet gear to target Atlantic herring.

Although gillnet gear was once a primary gear type for vessels whose primary target species was herring, the use of gillnet gear to target herring is currently largely limited to the bait fishery. There is a gillnet bait fishery prosecuted by some fraction of the lobster pot and tuna hand line fisheries. It has been suggested that 50 to 90% of the tuna hand gear fishermen use bait gillnets to secure live herring with which to bait their hooks. Under the Herring FMP, all commercial vessels catching herring for bait will be required to obtain herring permits and will be counted as directed herring vessels, even if herring is not their primary target species. Thus, even a bait gillnet vessel that does not sell the herring but uses the herring to catch a species that it does sell, such as lobster or tuna, is required to obtain a herring permit and comply with mandatory reporting. Bait gillnets are usually constructed with small mesh monofilament. The use of small mesh gear is restricted under the Multispecies FMP; however, certain exemptions are provided. Framework Adjustment 16 included an exemption for a certain type of small pelagic gillnets attached to the vessel. The restrictions on the use of pelagic gillnets in Framework 16 apply only

in the harbor porpoise closure areas; in other areas, the pelagic gillnet gear type is an exempted gear type under the Multispecies FMP and is, therefore, unrestricted.

In addition, vessels can use any kind of small mesh gillnet, including sink gillnets, to target herring in certain small mesh exemption areas in the Gulf of Maine/Georges Bank (GOM/GB), Southern New England (SNE), and Mid-Atlantic (MDA) regulated mesh areas. In the GOM/GB area, exemptions include the Cultivator Shoal Whiting Exemption Area (June 15 - October 31), Small Mesh Area 1 (July 15 - November 15), and Small Mesh Area 2 (January 1 - June 30). Any kind of small mesh gillnet can be used to target herring in the entire SNE and MDA regulated mesh areas. Regardless of the MSA authority under which bait gillnet vessels might be operating, these vessels are subject to requirements of the Atlantic Large Whale Take Reduction Plan (ALWTRP) and Harbor Porpoise Take Reduction Plan (HPTRP). The relationship between bait gillnet fisheries and the Herring FMP is somewhat indirect because these vessels would traditionally be considered part of their primary fishery, *e.g.*, lobster pot or tuna hand line, rather than a herring fishery. Therefore, it may be necessary to conduct extensive outreach activities to inform commercial vessels catching herring for bait that they must obtain herring permits and comply with mandatory reporting requirements.

Harvest capacity of the current herring fleet differs within and between gear sectors. Limited information is available regarding the harvest capacity, duration of tows/hauls/sets, or towing speeds for the various gear sectors. The EIS presents information on vessel characteristics for vessels landing herring in 1996. The purse seine vessels ranged from <15 to 169 gross registered tons (GRT), <45 to 75 feet in length, and <400 to 516 horsepower (hp), while the midwater trawl vessels ranged from 106 to 178 GRT, 68 to 91 feet, and 550 to 917 hp. [In comparison, the midwater trawl vessels engaged in the Georges Bank fishery in the 1960s and 1970s were represented in the 501 to 900, 901 to 1800, and >1800 GRT classes (Anthony and Waring 1980).] The NEFMC estimates the expected harvest capacity represented by the current and potential additional participants at 438,000 metric tons (mt)[2], which exceeds the current estimated maximum sustainable yield (MSY) by 121,000 mt.

Data on average catch-per-haul was collected by the Maine Department of Marine Resources in 1997 and 1998 during a study funded by NMFS through the Saltonstall-Kennedy program. During the August-October 1997 period, catches averaged 45,800 lbs/haul for single midwater trawl vessels; 135,600 lbs/haul for paired midwater trawls; and 90,400 lbs/set for purse seine vessels (Stevenson 1997). Overall, the catch ranged from 19,000 to 335,000 lbs/haul by trawl vessels and 8,000 to 165,000 lbs/set for purse seine vessels (Stevenson and Scully 1999, *in prep.*).

B. Status of the Herring Resource

A detailed discussion of current knowledge regarding the structure and dynamics of the Atlantic herring resource is contained in the EIS and EFH background documents. The exact structure and mechanics have not yet been determined. However, current theory suggests that there are geographically distinct spawning stocks which mix during other portions of the life cycle (Appendix A). For management purposes, the resource is assessed as one stock complex and is

assigned one MSY value, while total allowable catch (TAC) values are set through an area-based system approximating the theoretical spawning stock structure. Spawning stocks include the Nova Scotia, coastal Gulf of Maine (GOM), and Georges Bank/Nantucket Shoals (GB/NS) components, of which only the last two are in the action area for this consultation. The NEFMC has considered the effects of the Canadian fishery, in particular the considerable fishery for juvenile herring in New Brunswick waters, in setting harvest parameters for the U.S. EEZ.

The 1997 Atlantic herring stock biomass was estimated at 2.9 million mt, which is considered to be 260% of biomass at MSY. This information suggests that the resource is in an under-exploited state. However, this estimate may need to be corrected based on herring demographics. The NEFMC notes that recent stock assessment efforts suggest that there is considerable uncertainty regarding the current stock size which may compromise population models, and that the biomass may consequently be over-estimated.

Differences in timing and location of spawning have been observed historically, but the link between these potential anomalies and the dynamics of the overall resource is poorly understood. For example, it is not known whether the herring stock has recovered uniformly throughout its range to the degree observed for the GB/NS area or even whether biomass is increasing or decreasing in all areas. In recent years, the bulk of the herring landings in U.S. waters have been taken from the GOM area. Assessment data suggests that the GOM spawning component may not be able to sustain the current level of fishing pressure (NEFMC 1999).

Harvest specifications were set using a "conditioned surplus production model", which yields an MSY of 317,000 mt taking into account the Canadian harvest, a natural mortality rate of 0.20, and a companion target fishing mortality rate of 0.28. Although the model considered a range of biomass of the various resources over a 30-year period, the EIS does not discuss whether the natural mortality rate used allowed for the requirements of recovered predator stocks. The fishing mortality in 1997 was estimated at <0.10, which was below the overfishing threshold. Recent U.S. catch levels included 104,000 mt, of which 80,000 mt was taken from the GOM in 1996; and 98,271 mt, of which 70,171 mt was taken from the GOM in 1997. Although additional vessels entered the herring fishery in 1998, information is not yet available on the affect of these new entrants on harvest levels.

C. Proposed Atlantic Herring Fishery Management Plan

NMFS, in consultation with the Council, developed a series of proposed specifications (Table 1) for the Atlantic herring fishery which allocates various portions of harvesting and processing to different sectors of the industry. This apportionment was developed for the entire coastal stock complex, taking into account a Canadian harvest of up to 20,000 mt for the New Brunswick juvenile fishery and up to 10,000 for the Canadian harvest on Georges Bank. The initial specifications are intended to encourage the development of the offshore fishery. In general, the specifications may be adjusted annually. However, NMFS may make semi-annual or within-season adjustments to certain specifications. For example, if NMFS determines that the New Brunswick fishery is not likely to harvest the full amount of the allotted 20,000 mt, the remainder may be allocated to Area 1A to augment the initial domestic harvest allocation.

Table 1. Initial recommended Atlantic herring specifications.

Specification	Amount in metric tons (mt)
Allowable biological catch (ABC)	300,000
Optimal yield (OY)	224,000
Domestic annual harvest (DAH)	224,000
Domestic annual shoreside processing (DAP)	180,000
Domestic at-sea processing	0
Canadian transshipment (BT)	4,000
Total joint venture processing (JVPt)	40,000
Total EEZ Joint venture processing (JVPs)	15,000
JVPs - Area 1	0
JVPs - Area 2	10,000
JVPs - Area 3	5,000
Internal waters processing (IWP)	25,000
Reserve	0

Effort Management Measures

The primary effort control measure is an area-based Total Allowable Catch (TAC) system. The sum of all area TACs is equivalent to the DAH specification, which is also currently equivalent to the OY specification for Atlantic herring. A chart depicting the areas is included in Appendix B. The proposed initial DAH for the domestic fishery is 224,000 mt, or about one-tenth of the current biomass estimate. NMFS proposes to count catches as of January 1, 1999, toward the 1999 TACs. The DAH includes a built-in allowance for a 39 percent increase in stock size, allowing a margin for industry growth. The DAH will be distributed as delineated in Table 2.

Table 2. Proposed initial total allowable catch distribution for domestic harvest.

Management Area	Total Allowable Catch (TAC)
Area 1A (inshore Gulf of Maine)	45,000 mt
Area 1B (offshore Gulf of Maine)	25,000 mt
Area 2 (southern New England/Mid-Atlantic)	50,000 mt
Area 3 (Georges Bank)	50,000 mt
TAC Reserve	54,000 mt

To minimize the chance that TACs will be exceeded, the FMP includes within-season effort reduction measures. As the fishing mortality relative to the TAC increases, the FMP requires mandatory days out of the fishery. At levels of harvest projected to be 50%, 75%, and 90% of the TAC, vessels will be required to take Saturday-Sunday, Friday-Sunday, or Friday-Monday out of the fishery, respectively. At the point when catch projections estimate that 95% of the TAC in a given area is expected to be taken, the directed fishery in that area will be closed, and the remaining 5% of the TAC will be allocated for incidental catch only. The TAC system is expected to result in a shift in effort by the pre-FMP directed fishery from inshore to offshore in the Gulf of Maine and to Area 3 in the summer.

Herring are concentrated when spawning and therefore particularly vulnerable to capture by the fishery. The FMP includes several time/area "closures" of during herring spawning season. In certain times/areas, the fishery will be effectively closed to directed fishing on herring by imposing a 2,000 lbs per calendar day trip limit. At this time, spawning closures are only proposed for Area 1. The closures are listed in Table 3; a chart depicting these areas is included in Appendix C.

Table 3. Proposed spawning area closures.

Spawning Area	Closure Duration
Eastern Maine	August 15 - September 11
Western Maine	September - September 28
Cashes Ledge	August 1 - September 25
Jeffreys Ledge/Stellwagen Bank	September 15 - through October 12

In response to concerns that the herring resource would once again be depleted by factory trawlers, the FMP includes a limitation on the size, weight, and power of vessels. These limitations are designed to establish a ceiling on harvesting capacity. Harvesting vessels must be less than 165 feet in length, no more than 750 GRT, and have a shaft horsepower which does not exceed 3,000 hp. Vessels which exceed these measurements will only be able to engage in processing activities.

Supporting Administrative Measures

The proposed FMP will also implement the following supporting administrative measures:

- establishment of an annual review cycle with the fishing year starting January 1. As part of FMP monitoring, the advisory committees will recommend changes to the Council and the ASMFC no later than July of each year. Recommended adjustments could include revisions of the specifications and TACs for the following year. The Council will consult with the Commission and submit the final framework adjustment document containing recommend annual changes to NMFS by October 1.

- designation of four management areas (Appendix B) based on stock structure and fishing patterns. If necessary, these areas may be adjusted with new information on stock structure.
- requirement to obtain a federal permit (no limits on number of permits available) for vessels, operators, dealers, and processors. Joint venture processing operations will be required to secure a permit via application through the Department of State, with the opportunity for public comment. Permit conditions will include authorization to process in certain areas, mandatory 100% observer coverage, prohibition on operation in closed areas, and requirement to comply with general plan provisions such as mandatory data reporting.
- requirement to take observers if requested by NMFS
- vessel monitoring system (VMS)
- mandatory data reporting by vessels, processors, and dealers, including weekly interactive voice response (IVR) reports
- incorporation of Atlantic Coastal Cooperative Statistics Program (ACCSP) reporting when implemented
- limitation on at-sea transfers to 2,000 lbs/day during closures
- adoption of overfishing definition reference points
- designation of essential fish habitat
- requirement for utilization of carcasses resulting from the roe fishery
- establishment of a framework adjustment process

Measures which can be adjusted through frameworking include the following:

- management area boundaries
- number of management areas
- parameters of new or existing spawning area closures
- blocks of time out of the fishery
- incorporation of a days-at-sea (DAS) effort control system
- adjustments to specifications
- adjustments to amount of Canadian catch deduction
- distribution of the TAC among the various management times/areas
- incorporation of gear restrictions
- vessel size/horsepower restrictions
- incorporation of closed seasons
- minimum fish size
- trip limits
- seasonal, area, or industry sector quotas
- measures to protect Essential Fish Habitat
- measures to facilitate aquaculture
- changes to overfishing reference points
- changes in criteria for VMS requirements
- restrictions on use of herring products
- additional quota monitoring tools
- permit and vessel upgrading restrictions

- gear conflict reduction measures
- limitation on number of participants or access to the resource
- permit and reporting requirements
- procedures for framework adjustments
- observer requirements
- restrictions on JV operations
- at-sea transfer restrictions

STATUS OF AFFECTED SPECIES

NMFS has determined that the action being considered in this biological opinion may affect the following species and/or their critical habitat(s) provided protection under the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*; ESA):

Cetaceans

Northern right whale (*Eubalaena glacialis*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Blue whale (*Balaenoptera musculus*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter catodon*)	Endangered

Sea Turtles

Loggerhead sea turtle (*Caretta caretta*)	Threatened
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered
Green sea turtle (*Chelonia mydas*[2])	Endangered/Threatened

Fish

Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered

Critical Habitat Designations

Northern right whale	Cape Cod Bay and Great South Channel portions of Northern right whale critical habitat

This section will focus on status of the various species within the action area, summarizing information necessary to establish the environmental baseline and to assess the effects of the proposed action. Background information on the range-wide status of these species and a

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[2] *Pursuant to NMFS regulations at 50 CFR 227.71, the prohibitions of Section 9 of the Endangered Species Act apply to all green turtles, whether endangered or threatened.*

description of critical habitat can be found in a number of published documents including recent shortnose sturgeon (NMFS 1996) and sea turtle (NMFS and USFWS 1995, USFWS 1997) status reviews, Recovery Plans for the humpback whale (NMFS 1991a), right whale (NMFS 1991b), blue whale (NMFS 1998c), fin and sei whale (NMFS 1998a), shortnose sturgeon (NMFS 1998b), loggerhead sea turtle (NMFS and USFWS 1991) and leatherback sea turtle (NMFS and USFWS 1992) and the 1998 marine mammal stock assessment report (Waring *et al.* 1999).

Northern Right Whale

About half of the species' geographic range is within the action area for this consultation. In the action area as a whole, right whales are present throughout most months of the year, but are most abundant between February and June, with concentrations observed in the critical habitat areas. The species uses mid-Atlantic waters as a migratory pathway from the winter calving grounds off the coast of Florida to spring and summer nursery/feeding areas in the Gulf of Maine. NMFS designated right whale critical habitat on June 3, 1994, (59 FR 28793). Portions of the critical habitat within the action area include the waters of Cape Cod Bay and the Great South Channel off the coast of Massachusetts, where the species is concentrated at certain times of the year. Whales are most abundant in Cape Cod Bay between February and April (Hamilton and Mayo 1990; Schevill *et al.* 1986; Watkins and Schevill 1982) and in the Great South Channel in May and June (Kenney *et al.* 1986, Payne *et al.* 1990). Right whales in the Gulf of Maine feed on zooplankton, primarily copepods, by swimming at ("skim feeding") or below the water's surface with mouths slightly ajar, often for hours at a time (NMFS 1991a, Kenney *et al.* 1986, Murison and Gaskin 1989, Mayo and Marx 1990).

In the last several years, significant attempts have been initiated to determine the current status and trends of this very small population and to make valid recommendations on recovery requirements. Knowlton *et al.* (1994) concluded, based on data from 1987 through 1992, that the northern right whale population was growing at a net annual rate of 2.5% (CV=0.12). The data used in Knowlton *et al.* (1994) has recently been re-evaluated, and new attempts to model the trends of the northern right whale population are ongoing. One such study, Caswell *et al.* (1999), is described below.

Recognizing the precarious status of the right whale, the continued threats present in its coastal habitat throughout its range, and the uncertainty surrounding attempts to characterize population trends, the International Whaling Commission (IWC) held a special meeting of its Scientific Committee from March 19-25, 1998, in Cape Town, South Africa, to conduct a comprehensive assessment of right whales worldwide. The workshop's participants reviewed available information on the northern right whale, including Knowlton *et al.* (1994), Kraus (1997), and an early draft of Caswell *et al.* (1999). After considering this information, the workshop attendees concluded that it is unclear whether the Western North Atlantic stock of the northern right whale population is "declining, stationary or increasing, and [that] the best estimate of current population size is only 300 animals" (IWC 1998). Maintaining a conservative stance due to these uncertainties, participants concluded that the growth rate of this population "is both low and substantially less than that of the southern right whale populations" (IWC 1998).

The IWC Workshop participants expressed "considerable concern" in general for the status of the Western North Atlantic population. Based on recent (1993-1995) observations of near-failure of calf production, the significantly high mortality rate, and an observed increase in the calving interval, it was suggested that the slow but steady recovery rate published in Knowlton *et al.* (1994) may not be continuing. Workshop participants urgently recommended increased efforts to determine the trajectory of the northern right whale population, and NMFS' Northeast Fisheries Science Center has initiated several efforts to implement that recommendation.

Caswell *et al.* (1999), using data on reproduction and survival through 1996, determined that the northern right whale population was declining at a rate of 2.4% per year. One model they used suggested that the mortality rate of the right whale population has increased five-fold in less than one generation. According to Caswell *et al.* (1999), if the mortality rate as of 1996 is not decreased and the population performance improved, extinction could occur within 100 years and would be certain within 400 years with a mean time to extinction of 191 years.

It should be noted that no information is currently available on the response of the right whale population to recent (1997-1999) efforts to mitigate the effects of entanglement and ship strikes. Therefore, it is not possible to determine whether the trend through 1996, as reported in Caswell *et al.* (1999), is continuing. Furthermore, results reported in Caswell *et al.* (1999) suggest that it is not possible to determine that anthropogenic mortalities alone are responsible for the decline in right whale survival. However, they conclude that reduction of anthropogenic mortalities would significantly improve the northern right whale's probability of surviving. Given uncertainty about the effects of natural phenomena like demographic and environmental stochasticity which can the northern right whale population — and assuming that the right whale population, is in fact, declining — it is impossible to determine if the northern right whale population has reached the point where it would continue to decline even if all human-induced mortalities ceased.

At the 1998 IWC workshop, an inter-sessional Steering Group was established to review Caswell *et al.* (1999) and several other ongoing assessment efforts to identify the best and most current available scientific information on population status and trends. The IWC Scientific Committee met in May 1999 and discussed the Steering Group's report. Committee members noted that there were several potential negative biases in Caswell *et al.* (1999) but agreed that the results of the study should be considered in management actions. Discussion on the Caswell *et al.* (1999) results and several ongoing studies will continue in the context of a special inter-sessional right whale status and trends workshop to be hosted by the IWC in the fall of 1999.

For the purposes of this Biological Opinion — and until the new status and trend information has been thoroughly reviewed for assimilation into NMFS management programs — NMFS will continue to adopt the risk averse assumption that the northern right whale population is declining.

General human impacts and entanglement

The major known sources of anthropogenic mortality and injury of right whales include entanglement in commercial fishing gear and ship strikes. Right whales may also be adversely

affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries.

Based on photographs of catalogued animals from 1959 and 1989, Kraus (1990) estimated that 57% of right whales exhibited scars from entanglement and 7% from ship strikes (propeller injuries). This work was updated by Hamilton *et al.* (1998) using data from 1935 through 1995. The new study estimated that 61.6% of right whales exhibit injuries caused by entanglement, and 6.4 % exhibit signs of injury from vessel strikes. Hamilton *et al.* (1998) also reported that the increase in entanglement scarring since 1989 is a significant trend which is not attributable to increases in sighting effort or population size. In addition, several animals have apparently been entangled on more than one occasion. Some right whales that have been entangled were subsequently involved in ship strikes. These numbers are primarily based on sightings of free-swimming animals that initially survive the encounter. Because some animals may drown or be killed immediately, the actual number of interactions may be slightly higher. Following is a summary of recent (1996 through mid-1999) documented cases of human interaction. These numbers should be viewed as absolute minimum numbers. The total number of mortalities and injuries cannot be estimated but is believed to be higher.

Six right whale mortalities resulting from various causes were recorded in 1996. In addition to these mortalities, 2 reports of right whale entanglement in fishing gear were received during 1996. One, classified as a serious injury, was not relocated; the other was disentangled and was seen the following year with a calf. Preliminary data from 1997 indicates that one mortality occurred from natural or unknown causes, another mortality occurred due to a ship strike in the Bay of Fundy, and 8 entanglements were reported. Six of the entanglements were reported in Canadian waters and 2 in U.S. waters; it should be noted that the point of occurrence is only known for two of the 1997 entanglement events (one in U.S. and one in Canadian waters), and one of the reports may represent a resighting of an earlier entanglement. In 1998, two known mortalities occurred, as evidenced by stranded carcasses. The first was the mortality of a calf due to natural causes and the second was an adult male, for which cause of death has not been determined. Two adult female right whales were discovered in a weir off Grand Manan Island in the Bay of Fundy on July 12, 1998, and were released two days later; no residual injuries of concern were reported. On July 24, 1998, the Disentanglement Team removed line from around the tail stock of a right whale which was originally seen entangled in the Bay of Fundy on August 26, 1997. This same whale, apparently debilitated from the earlier entanglement, became entangled in lobster pot gear twice in one week in Cape Cod Bay in September 1998. The gear from the latter two entanglements was completely removed, but line from the 1997 entanglement remained in the animal's mouth. On August 15, 1998, a right whale was observed entangled in the Gulf of St. Lawrence; the animal apparently freed itself of most of the gear, but some gear may remain. Thus far in 1999, one mortality has been documented. This was an adult female which was found floating near Truro, Massachusetts, and was towed to the beach for necropsy. Evidence of pre-mortem ship strike injuries and disease was found, but the cause of death has not yet been conclusively determined. In addition, one of the animals that was entangled in 1997 and thought to be free of gear later that year (and when seen in 1998) was re-sighted on April 21, 1999, in poor condition. The role of the 1997 entanglement in the deterioration of the whale's

health has not yet been determined. Five reports of entangled right whales (possibly involving fewer than 5 individuals) were received from April 25 through June 5, 1999. Disentanglement was attempted for two of the animals. A rescue attempt of one animal was made in May; some of the trailing gear was subsequently shed, but most remained on the animal. An animal sighted in the Bay of Fundy in June was nearly completely disentangled; a small piece of line remains in the mouth. At this time, neither gear type nor point of origin has been determined for any of the 1999 entanglements.

Humpback Whale

Humpback whales feed in the northwestern Atlantic during the summer months and migrate to calving and mating areas in the Caribbean. Six separate feeding areas are utilized in northern waters after their return; the Gulf of Maine, which is within the action area of this consultation, is one of those feeding areas. Humpback whales also use the Mid-Atlantic as a migratory pathway and apparently as a feeding area, at least for juveniles. Since 1989, observations of juvenile humpbacks in that area have been increasing during the winter months, peaking January through March (Swingle *et al.* 1993). Biologists theorize that non-reproductive animals may be establishing a winter feeding range in the Mid-Atlantic since they are not participating in reproductive behavior in the Caribbean. It is assumed that humpbacks are more widely distributed in the action area than right whales. They feed on a number of species of small schooling fishes, particularly sand lance and Atlantic herring, by targeting fish schools and filtering large amounts of water for the associated prey. Humpbacks have also been observed feeding on krill.

New information has become available on the status and trends of the humpback whale population in the North Atlantic. Although current and maximum net productivity rates are unknown at this time, the population is apparently increasing. It has not yet been determined whether this increase is uniform across all six feeding stocks (Waring *et al.* 1999). The rate of increase has been estimated at 9.0% (CV=0.25) by Katona and Beard (1990), while a 6.5% rate was reported for the Gulf of Maine by Barlow and Clapham (1997) using data through 1991. The rate reported by Barlow and Clapham (1997) may roughly approximate the rate of increase for the portion of the population within the action area. The best estimate of abundance for the North Atlantic humpback whale population is 10,600 animals (CV=0.067; Smith *et al.* 1999), while the minimum population estimate used for NMFS management purposes is 10,019 animals (CV = 0.067; Waring *et al.* 1999). The Northeast Fisheries Science Center is considering recommending that NMFS identify the Gulf of Maine feeding stock as the management stock for this population in U.S. waters. A population estimate for the Gulf of Maine portion of the population is not available at this time. The NEFSC is funding a study to determine stock identity of animals found in the Mid-Atlantic. The results from this work will assist NMFS in determining whether multiple management units are necessary for the action area.

General human impacts and entanglement

The major known sources of anthropogenic mortality and injury of humpback whales include entanglement in commercial fishing gear and ship strikes. Humpback whales may also be

adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries.

Based on photographs of the caudal peduncle of humpback whales, Robbins and Mattila (1999) estimated that at least 48% — and possibly as many as 78% — of animals in the Gulf of Maine exhibit scarring caused by entanglement. Several animals have apparently been entangled on more than one occasion. These estimates are based on sightings of free-swimming animals that initially survive the encounter. Because some animals may drown immediately, the actual number of interactions may be slightly higher. Following is a summary of recent (1996 through mid-1999) documented cases of human interaction. These numbers should be viewed as absolute minimum numbers. The total number of mortalities and injuries cannot be estimated but is believed to be higher.

In 1996, 3 humpback whales were killed in collisions with vessels and at least 5 were seriously injured by entanglement in the same year. Three confirmed humpback whale entanglements were reported in 1997. Stranding records from 1997 include 4 stranded/dead floating humpback whales in the Northeast Region (Maine - Virginia). For 1998, 14 confirmed humpback whale entanglements resulting in injury (n=13) or mortality (n=1) were reported. One of the animals with entanglement injuries stranded dead, but the role of the entanglement in the whale's death has not been determined. Three of the injured animals were completely disentangled, one partially disentangled, one partially disentangled and later shed the remaining gear, and one shed the gear without assistance from the Disentanglement Team. One injury from a vessel interaction was reported in 1998; the whale was seen several times after the injury, which exhibited some healing. Three confirmed incidents of dead floating humpback whales were also reported in 1998; however, cause of death has not been determined for any of these animals. Thus far in 1999, two entanglement interactions have been reported. The first was a stranded animal with injuries indicating death due to drowning in fishing gear. The second was an animal found entangled in gillnet gear deployed in a state-regulated fishery off North Carolina. The whale freed itself from one net and became entangled in another net, from which it was released by the Disentanglement Network. In addition, a mortality involving an animal found floating with no obvious signs of human interaction was reported.

Fin Whale

The fin whale is ubiquitous in the North Atlantic and occurs from the Gulf of Mexico and Mediterranean Sea northward to the edges of the arctic ice pack (NMFS 1998a). The overall pattern of fin whale movement is complex, consisting of a less obvious north-south pattern of migration than that of right and humpback whales. Based on acoustic recordings from hydrophone arrays, however, Clark (1995) reported a general southward "flow pattern" of fin whales in the fall from the Labrador/Newfoundland region, south past Bermuda, and into the West Indies. The overall distribution may be based on prey availability, and fin whales are found throughout the action area for this consultation in most months of the year. This species preys opportunistically on both invertebrates and fish (Watkins *et al.* 1984). As with humpback whales,

they feed by filtering large volumes of water for the associated prey. Fin whales are larger and faster than humpback and right whales and are less concentrated in nearshore environments.

Insufficient data are available to determine status and trends of the Western North Atlantic stock of the fin whale population (Waring *et al.* 1999). Hain *et al.* (1992) estimated that about 5,000 fin whales inhabit the northeastern United States continental shelf waters. Shipboard surveys of the northern Gulf of Maine and lower Bay of Fundy targeting harbor porpoise for abundance estimation provided an imprecise estimate of 2,700 (CV=0.59) fin whales, from which the current minimum population estimate of 1,704 animals (CV = 0.59) was derived (Waring *et al.* 1999).

General human impacts and entanglement

The major known sources of anthropogenic mortality and injury of fin whales include entanglement in commercial fishing gear and ship strikes. Fin whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources due to trophic effects resulting from a variety of activities including the operation of commercial fisheries.

Following is a summary of recent (1996 through mid-1999) documented cases of human interaction. These numbers should be viewed as absolute minimum numbers. The total number of mortalities and injuries cannot be estimated but is believed to be higher.

In 1996, three reports of ship strikes were received; although this impact source was only confirmed as cause of death for one of the incidents. One entanglement report was received in 1996. Five confirmed reports of entangled fin whales were received by NMFS in 1997. Four fin whales were reported as having stranded in the period from January 1, 1997, to January 1, 1998, in the Northeast Region; the cause of death was not determined for these animals. One ship strike mortality was documented in 1998 in the Virginia-North Carolina border area, and one entanglement mortality was reported in September 1998. Thus far in 1999, two dead floating fin whales have been reported; no information is currently available on evidence of human interaction in these events.

Blue whale

Compared to the other species of large whales, relatively little is known about this species. Blue whale range in the North Atlantic extends from the subtropics to Baffin Bay and the Greenland Sea (Yochem and Leatherwood 1985). This species is highly mobile, spending little time in any one area. Large euphausiid crustaceans (*Thysanoessa inermis* and *Meganyctiphanes norvegica)* make up the bulk of the blue whale's diet. Fish and copepods may also be consumed but are not likely to be significant diet components (NMFS 1998c).

There are insufficient data to determine the status and trends of the blue whale population in the Western North Atlantic (Waring *et al.* 1999). The Recovery Plan for the blue whale (NMFS 1998c) summarizes what is known about blue whale abundance in the western North Atlantic

and concludes that the population probably numbers in the low hundreds. More than 320 individuals were photo-identified in the Gulf of St. Lawrence between 1979-1995, while 352 individuals were catalogued from eastern Canada and New England through Autumn 1997 (Sears *et al.* 1990; and Sears, pers. comm., reported in NMFS 1998c).

General human impacts and entanglement

The major known anthropogenic impact on blue whales also involves entanglement and ship strikes. Other impacts noted above for other baleen whales may also occur. However, because blue whales rarely enter the action area, human activities are likely to have less impact on blue whales than for right, humpback and fin whales.

No recent entanglements of blue whales have been reported from the U.S. Atlantic. In 1987, concurrent with an unusual influx of blue whales into the Gulf of Maine, one report was received from a whale watch boat that spotted a blue whale entangled in gear described as probable lobster pot gear in the southern Gulf of Maine. In March 1998, a juvenile male blue whale was brought into Rhode Island waters on the bow of a tanker. Cause of death was determined to be due to ship strike, although not necessarily caused by the tanker on which it was observed, and the strike may have occurred outside the U.S. EEZ (Waring *et al.* 1999).

Sei Whale

The sei whale population in the western North Atlantic is assumed to consist of two stocks, a Nova Scotian Shelf stock and a Labrador Sea stock. Within the action area, the sei whale is most common on Georges Bank and into the Gulf of Maine/Bay of Fundy region during spring and summer, primarily in deeper waters. Individuals may range as far south as North Carolina. There are occasional influxes of this species further into Gulf of Maine waters, presumably in conjunction with years of high copepod abundance inshore. Sei whales are occasionally seen feeding in association with right whales in the southern Gulf of Maine and in the Bay of Fundy. Although sei whales may prey upon small schooling fish and squid in the action area, available information suggests that calanoid copepods and euphausiids are the primary prey of this species.

There are insufficient data to determine trends of the sei whale population. Because there are no abundance estimates within the last 10 years, a minimum population estimate cannot be determined for NMFS management purposes (Waring *et al.* 1999). Abundance surveys are problematic as this species is difficult to distinguish from the fin whale.

General human impacts and entanglement

Few instances of injury or mortality of sei whales due to human impacts have been recorded in U.S. waters. Entanglement is not known to impact this species in the U.S. Atlantic, possibly because sei whales typically inhabit waters further offshore than most commercial fishing operations. A small number of ship strikes of this species have been recorded. The most recent documented incident occurred in 1994 when a carcass was brought in on the bow of a container ship in Charlestown, Massachusetts. Other impacts noted above for other baleen whales may

occur to a very limited extent. Due to the offshore distribution of this species, interactions that do occur are less likely to be reported than those involving right, humpback, and fin whales occurring in nearshore areas.

Sperm whale

The sperm whale occurs throughout the U.S. EEZ on the continental shelf edge, over the continental slope, and into the mid-ocean regions. It is unclear whether the northwest Atlantic population is discrete from the northwestern or northeastern Atlantic populations (Waring *et al.* 1999). The marine mammal SAR also notes that sperm whales are distributed in a distinct seasonal cycle, concentrated east-northeast of Cape Hatteras in winter and shifting northward in spring when whales are found throughout the Mid-Atlantic Bight. Distribution extends further northward to areas north of Georges Bank and the Northeast Channel region in summer and then south of New England in fall, back to the Mid-Atlantic Bight. Sperm whales are known to prey primarily upon squid.

The best abundance estimate that is currently available for the western North Atlantic sperm whale population is 2,698 (CV=0.67) animals, and the minimum population estimate used for NMFS management purposes is 1,617 (CV=0.67) (Waring *et al.* 1999). No information is available on population trends at this time for the western North Atlantic sperm whale stock.

General human impacts and entanglement

Few instances of injury or mortality of sperm whales due to human impacts have been recorded in U.S. waters. Like sei whales, sperm whales typically inhabit waters further offshore than most commercial fishing operations. Documented takes primarily involve offshore fisheries such as the offshore lobster pot fishery and pelagic driftnet and longline fisheries. Sperm whales are also struck by ships, although no information is available on recent confirmed cases in U.S. waters. Other impacts noted above for other baleen whales may occur to a very limited extent. Due to the offshore distribution of this species, interactions that do occur are less likely to be reported than those involving right, humpback, and fin whales occurring in nearshore areas.

The NMFS Sea Sampling program has recorded three entanglements (1989, 1990, 1995) of sperm whales in the swordfish drift gillnet fishery. All three animals were injured, found alive, and "released"; at least one was still carrying gear. For the years 1993-1997, opportunistic reports of sperm whale entanglement include three records involving offshore lobster pot gear, heavy monofilament line, and fine mesh gillnet from an unknown source.

Loggerhead Sea Turtle

The threatened loggerhead is the most abundant species of sea turtle in U.S. waters, commonly occurring throughout the inner continental shelf from Florida through Cape Cod, Massachusetts. This species is found in a wide range of habitats throughout the temperate and tropical regions of the Atlantic. These include open ocean, continental shelves, bays, lagoons, and estuaries (NMFS and USFWS 1995). In the action area of this consultation they are most common on the open

ocean in the northern Gulf of Maine, particularly where associated with warmer water fronts formed from the Gulf Stream. The species is also found in entrances to bays and sounds and within bays and estuaries, particularly in the Mid-Atlantic.

The activity of the loggerhead is limited by temperature. Keinath *et al.* (1987) observed sea turtle emigration from the Chesapeake Bay when water temperatures cooled to below 18°C, generally in November. Work in North Carolina showed a significant movement of sea turtles into more northern waters at 11°C (Chester *et al.* 1994). Scientists studying movements of turtles in New York waters have seen loggerheads remain in that area for extended periods at temperatures as low as 8°C (NMFS 1995b). Surveys conducted offshore and sea turtle strandings during November and December off North Carolina suggest that sea turtles emigrating from northern waters in fall and winter months may concentrate in nearshore and southerly areas influenced by warmer Gulf stream waters (Epperly *et al.* 1995). This is supported by the collected work of Morreale and Standora (Morreale and Standora 1998) who tracked 12 loggerheads and 3 Kemp's ridleys by satellite. All of the turtles tracked similar spatial and temporal corridors, migrating south from Long Island Sound, NY, in a time period of October through December. The turtles traveled within a narrow band along the continental shelf and became sedentary for one to two months south of Cape Hatteras. Some of the turtles lingered between Cape Lookout Shoals and Frying Pan Shoals offshore of Wilmington, North Carolina prior to moving south or into the Gulf Stream.

The loggerhead's winter and early spring range is south of 37°00' N in estuarine rivers, coastal bays, and shelf waters of the southeastern United States. Loggerheads move northward and enter northeast coastal embayments as water temperatures approach 20°C (Burke *et al.* 1989; Musick *et al.* 1984), leaving the northern embayments in the fall when water temperatures drop. Since they are limited by water temperatures, sea turtles do not usually appear on the summer foraging grounds in the Gulf of Maine until June, but are found in Virginia as early as April. They remain in these areas until as late as November and December in some cases, but the large majority are leaving the Gulf of Maine by mid-September. Aerial surveys of loggerhead turtles at sea north of Cape Hatteras indicate that they are most common in waters from 22 to 49 m deep, although they range from the beach to waters beyond the continental shelf (Shoop and Kenney 1992). There is no information regarding the activity of these offshore turtles.

Loggerhead sea turtles are primarily benthic feeders, opportunistically foraging on crustaceans and mollusks. Under certain conditions they also feed on finfish, particularly if they are easy to catch (*e.g.*, caught in gillnets or inside pound nets where the fish are accessible to turtles).

During 1996, a Turtle Expert Working Group (TEWG) met on several occasions and produced a report assessing the status of the loggerhead sea turtle population in the Western North Atlantic (WNA). Of significance is the conclusion that in the WNA, there are at least 4 loggerhead subpopulations separated at the nesting beach (TEWG 1998). This finding was based on analysis of mitochondrial DNA, which the turtle inherits from its mother. It is theorized that nesting assemblages represent distinct genetic entities, but further research is necessary to address the stock definition question. These nesting subpopulations include the following areas: northern North Carolina to northeast Florida, south Florida, the Florida Panhandle, and the Yucatan

Peninsula. Genetic evidence has shown that loggerheads from Chesapeake Bay southward to Georgia are nearly equally divided in origin between South Florida and northern subpopulations. Work is currently ongoing in the Northwestern North Atlantic to collect samples which will provide information relative to turtles north of the Chesapeake, which is most of the action area for this consultation.

The loggerhead turtle was listed as "threatened" under the ESA on July 28, 1978, but is considered endangered by the World Conservation Union (IUCN) and under the Convention on International Trade in Endangered Species of Flora and Fauna (CITES). The significance of the results of the TEWG analysis is that the northern subpopulation may be experiencing a significant decline (2.5% - 3.2% for various beaches). A recovery goal of 12,800 nests has been assumed for the Northern Subpopulation, but current nests number around 6,200 (TEWG 1998). Since the number of nests declined in the 1980's, the TEWG concluded that it is unlikely that this subpopulation will reach this goal given current stresses on population performance. Considering this apparent decline as well as the lack of information on the subpopulation from which loggerheads in the WNA are derived, progress must continue to reduce the adverse effects of fishing and other human-induced mortality on this population.

The most recent 5-year ESA sea turtle status review (NMFS and USFWS 1995) reiterates the difficulty of obtaining detailed information on sea turtle population sizes and trends. Most long-term data is from the nesting beaches, and this is often complicated by the fact that they occupy extensive areas outside U.S. waters. The TEWG was unable to determine acceptable levels of mortality. This status review supports the conclusion of the TEWG that the northern subpopulation may be experiencing a decline and that inadequate information is available to assess whether its status has changed since the initial listing as threatened in 1978. The current recommendation from the 5-year review is to retain the threatened designation but note that further study is needed before the next status review is conducted.

General human impacts and entanglement

Human-caused mortality and serious injury to loggerheads in the action area of this consultation is varied and difficult to quantify. Although fishing gear entanglement has been proposed as mortality source leading to pulses of strandings, this has been difficult to demonstrate conclusively because turtle carcasses are not as likely to display evidence of net or line marks as is typical for cetaceans. Known impact sources include incidental take in commercial (and possibly recreational) fisheries, dredging operations, power plant cooling water intakes, and vessel strikes. Commercial fisheries in the action area known to interact with loggerheads include finfish trawl fisheries, several gillnet fisheries, and pot fisheries for finfish and shellfish. Although incidental take in the shrimp fishery is a major source of impact in the Southeast, little information is available on takes in northeast shrimp fisheries. Although the pelagic longline fishery does not operate in the action area for this consultation, this fishery takes large numbers of turtles. In 1995 the total incidental take for the pelagic longline fishery was estimated to be more than 1,500 turtles, many of which ingested the hook. Takes of loggerhead turtles have been observed in the bottom longline fishery for sharks in the Southeast. Bottom longline fisheries

using baited hooks operate in the action area. Although incidental take of loggerheads in these fisheries has been reported anecdotally, it has not been conclusively documented.

Total coast-wide loggerhead mortality levels are largely unknown, and it is not currently possible to reliably assess other life-history parameters. Therefore, the TEWG (1998) was forced to conclude that an estimate of the maximum number of individual loggerheads that can be taken incidental to commercial fishing without compromising recovery cannot be provided at this time. The use of turtle excluder devices (TED) in the shrimp fishery have reportedly reduced lethal takes by 54%, and declines have also been seen where TEDs are used in the summer flounder fishery (TEWG 1998). The level of take in the southeast shrimp fishery has been 4,500 loggerhead turtles annually, and a comparable amount is also taken in the pelagic longline fishery. Based on a limited study, the level of mortality in the longline fishery was estimated at 30% in the most recent biological opinion on the fishery (NMFS 1999a), but true mortality estimates are not available at this time.

Work is ongoing at the NMFS/NEFSC to continue to evaluate this question in addition to a review of all fisheries in the western Atlantic for which observer data is available. Bycatch estimates for loggerheads will be made for all fisheries for which sample sizes are sufficiently large to permit reasonable statistical analysis. This will be compiled into an assessment report which is expected by the end of 1999. Until that analysis is completed, the only information on magnitude of take available for fisheries in the action area is unextrapolated numbers of observed takes from the sea sampling data. A preliminary data pull (1994-1998) from the NEFSC sea sampling database shows the following loggerhead takes: 209 (pelagic longline), 23 (otter trawl), 18 (coastal trawl), 15 (anchored gillnet), 82 (pelagic driftnet), 1 (scallop dredge). Considering that barely 5% coverage is achieved in the anchored gillnet fishery, for which one of the higher take rates is observed, the actual number of takes in all fisheries combined is likely to be significant.

Leatherback Sea Turtle

The leatherback is the largest living turtle and ranges farther than any other sea turtle species, exhibiting broad thermal tolerances (NMFS and USFWS 1995). Leatherback turtles feed primarily on cnidarians (medusae, siphonophores) and tunicates (salps, pyrosomas) and are often found in association with jellyfish. These turtles are found throughout the action area of this consultation and, while predominantly pelagic, they occur annually in places such as Cape Cod Bay and Narragansett Bay during certain times of the year, particularly the Fall. Of the turtle species common to the action area, leatherback turtles seem to be the most susceptible to entanglement in pot gear and pelagic trawl gear. The susceptibility to entanglement in pot gear may be the result of attraction to gelatinous organisms and algae that collect on buoys and buoy lines at or near the surface.

Nest counts are the only reliable population information available for leatherback turtles. Recent declines have been seen in the number of leatherbacks nesting worldwide (NMFS and USFWS 1995). The status review notes that it is unclear whether this observation is due to natural fluctuations or whether the population is at serious risk. With regard to repercussions of these

observations for the U.S. leatherback populations in general, it is unknown whether they are stable, increasing, or declining, but it is certain that some nesting populations (*e.g.*, St. John and St. Thomas, U.S. Virgin Islands) have been extirpated.

General human impacts and entanglement

Anthropogenic impacts to the leatherback population are similar to those discussed above for the loggerhead sea turtle. At a workshop held in the Northeast in 1998 to develop a management plan for leatherbacks, experts expressed the opinion that incidental takes in fisheries were likely higher than is being reported. Two to three leatherbacks are reported entangled in the buoy lines of lobster pot gear every year. Anecdotal accounts by fishermen support the idea that they have many more encounters than are reported. Entanglement in other pot gear set for other species of shellfish and finfish in the action area has also been documented. Prescott (1988) reviewed stranding data for Cape Cod Bay and concluded that for those turtles where cause of death could be determined (the minority), entanglement is the leading cause of death followed by capture by dragger, cold stunning, or collision with boats. More leatherback-fishery interactions seem to be indicative of entanglement in buoy lines and longline gear than are documented for gillnets and trawl gear. However, this may be an artifact of the lesser likelihood of finding marks from gillnets or trawl gear on stranded animals. Based on an average from 1994-1995 data, annual estimates of take of leatherbacks in the pelagic longline fishery reported in the latest biological opinion (NMFS 1999a) was 690; it is not likely that the level of take has decreased in recent years.

Preliminary 1994-1995 sea sampling data summaries shows the following takes of leatherbacks: 1 (pelagic longline), 4 (anchored gillnet), 1 (pelagic gillnet). Leatherback bycatch estimates will be included in the comprehensive turtle bycatch analysis discussed above. Leatherbacks were also taken in the temporary experimental pelagic pair trawl fishery for tunas, which is no longer authorized. Sea sampling coverage in the southeast shrimp fishery and shark bottom longline fishery has also recorded takes of leatherback turtles.

Kemp's Ridley Sea Turtle

The Kemp's ridley is probably the most endangered of the world's sea turtle species. The only major nesting site for ridleys is a single stretch of beach near Rancho Nuevo, Tamaulipas, Mexico (Carr 1963). Estimates on the adult population reached a low of 1,050 in 1985, and have increased to 3,000 individuals in 1997. First-time nesting adults have increased from 6% to 28% from 1981 to 1989, and from 23% to 41% from 1990 to 1994, indicating that the ridley population may be in the early stages of exponential growth (TEWG 1996).

Juvenile Kemp's ridleys use northeastern and mid-Atlantic coastal waters of the U.S. Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Post-pelagic ridleys feed primarily on crabs, consuming a variety of species, including *Callinectes* sp., *Ovalipes* sp., *Libinia* sp., and *Cancer* sp. Mollusks, shrimp, and fish are consumed less frequently (Bjorndal 1997). Juvenile ridleys

migrate south as water temperatures cool in fall, and are predominantly found in shallow coastal embayments along the Gulf Coast during fall and winter months.

Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 40 centimeters in carapace length, and weighing less than 20 kilograms (Terwilliger and Musick 1995). Next to loggerheads, they are the second most abundant sea turtle in Virginia and Maryland waters, arriving in these areas during May and June, and emigrating to more southerly waters from September to November (Keinath *et al.* 1987; Musick and Limpus 1997). In the Chesapeake Bay, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick 1985; Bellmund *et al.* 1987; Keinath *et al.* 1987; Musick and Limpus 1997). The juvenile population in Chesapeake Bay is estimated to be 211 to 1,083 turtles (Musick and Limpus 1997).

Juvenile ridleys follow regular coastal routes during spring and fall migrations to and from developmental foraging grounds along the mid-Atlantic and northeastern coastlines. Consequently, many ridleys occurring in coastal waters off Virginia and Maryland are transients involved in seasonal migrations. However, Maryland's and Virginia's coastal embayments – which contain an abundance of crabs, shrimp, and other prey as well as preferred foraging habitat such as shallow subtidal flats and submerged aquatic vegetation beds — are likely used as a foraging ground by Kemp's ridley sea turtles (John Musick, Virginia Institute of Marine Science, 1998 personal communication; Sherry Epperly, National Marine Fisheries Service, Beaufort Laboratory, Beaufort North Carolina, 1998 personal communication; Molly Lutcavage, New England Aquarium, 1998 personal communication). No known nesting occurs on Virginia or Maryland beaches.

General human impacts and entanglement

Anthropogenic impacts to the Kemp's ridley population are similar to those discussed above for the loggerhead sea turtle. Mortality in the large juvenile and adult life stage would have the greatest impact to the Kemp's ridley population (TEWG, 1998). The vast majority of ridleys identified along the Atlantic Coast have been juveniles and subadults. Loss of individuals, particularly large juveniles, in the Atlantic resulting from human activities may therefore impede recovery of the Kemp's ridley sea turtle population. Sea sampling coverage in the northeast otter trawl fishery, pelagic longline fishery, and southeast shrimp and summer flounder bottom trawl fisheries has recorded takes of Kemp's ridley turtles. As with loggerheads, a large number of Kemp's ridleys are taken in the southeast shrimp fishery each year. This species may also be taken in the northeast shrimp fishery and bottom longline fisheries. An estimate of the number of Kemp's ridley turtles that can be removed by fishery mortality without compromising recovery cannot be provided at this time due to data deficiencies TEWG (1998) .

Green Sea Turtle

Green turtles are distributed circumglobally, mainly in waters between the northern and southern 20°C isotherms (Hirth 1971). In the western Atlantic, several major nesting assemblages have been identified and studied (Peters 1954; Carr and Ogren 1960; Duellman 1961; Parsons 1962;

Pritchard 1969; Carr *et al.* 1978). However, most green turtle nesting in the continental United States occurs on the Atlantic Coast of Florida (Ehrhart 1979). Only one nest has been reported on the Florida Panhandle (Schroeder, pers. comm.). Most green turtle nesting activity occurs on Florida index beaches. These index beaches were established to standardize data collection methods and effort on key nesting beaches. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the six years of regular monitoring since establishment of the index beaches in 1989. There is evidence that green turtle nesting has been on the increase during the past decade. For example, increased nesting has been observed along the Atlantic coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). Recent population estimates for the western Atlantic area are not available.

While nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging grounds. Juvenile green sea turtles occupy pelagic habitats after leaving the nesting beach. Pelagic juveniles are assumed to be omnivorous, but with a strong tendency toward carnivory during early life stages. At approximately 20 to 25 cm carapace length, juveniles leave pelagic habitats, and enter benthic foraging areas, shifting to a chiefly herbivorous diet (Bjorndal 1997). Post-pelagic green turtles feed primarily on sea grasses and benthic algae, but also consume jellyfish, salps, and sponges. Known feeding habitats along U.S. coasts of the western Atlantic include shallow lagoons and embayments in Florida, and similar shallow inshore areas elsewhere. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida, the northwestern coast of the Yucatan Peninsula, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean Coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1971). The preferred food sources in these areas are *Cymodocea, Thalassia, Zostera, Sagittaria, and Vallisneria* (Carr 1952; 1954; Mexico 1966).

Although no green turtle foraging areas or major nesting beaches have been identified on the Atlantic Coast, evidence provided by Mendonca and Ehrhart (1982) indicates that immature green turtles may utilize lagoonal systems for foraging. These authors identified a population of young green turtles (carapace length 29.5-75.4 cm) believed to be resident in Mosquito Lagoon, Florida. The Indian River system, of which Mosquito Lagoon is a part, supported a green turtle fishery during the late 1800s (Ehrhart 1983), and these turtles may be remnants of this historical colony. Additional juvenile green turtles occur north to Long Island Sound, presumably foraging in coastal embayments. In North Carolina, green turtles are known from estuarine and oceanic waters. Recently, green turtle nesting occurred on Bald Head Island, just east of the mouth of the Cape Fear River, on Onslow Island, and on Cape Hatteras National Seashore. No information is available regarding the occurrence of green turtles in the Chesapeake Bay, although they are presumably present in very low numbers.

In the western Atlantic region, the summer developmental habitat encompasses estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and the North Carolina sounds, and south throughout the tropics (Musick and Limpus 1997). Most of the individuals reported in U.S. waters are immature (Thompson 1988). Individuals that use waters north of

Florida during the summer must return to southern waters in autumn, or face the risk of cold stunning.

General human impacts and entanglement

Anthropogenic impacts to the green sea turtle population are similar to those discussed above for the loggerhead sea turtle. Sea sampling coverage in the pelagic driftnet, pelagic longline, scallop dredge, southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green turtles. The shrimp fishery has been estimated as taking as many as 300 turtles a year. Stranding reports indicate that between 200-300 green turtles strand annually from a variety of causes (Sea Turtle Stranding and Salvage Network, unpublished data). As with the other species, fishery mortality accounts for a large proportion of annual human-caused mortality outside the nesting beaches, while other activities like dredging, pollution, and habitat destruction account for an unknown level of other mortality. Green turtle takes have been documented in gillnet, trawl and longline gear. Preliminary sea sampling data summary (1994-1998) sows the following takes of green turtles: 1 (anchored gillnet), 2 (pelagic driftnet), 2 (pelagic longline).

Shortnose Sturgeon

Shortnose sturgeon occur in large rivers along the western Atlantic coast from the St. Johns River, Florida (possibly extirpated from this system), to the Saint John River in New Brunswick, Canada. The species is anadromous in the southern portion of its range (*i.e.*, south of Chesapeake Bay), while northern populations are amphidromous (NMFS 1998b). Population sizes vary across the species' range. From available estimates, smallest populations occur in the Cape Fear (~ 8 adults) (Moser and Ross 1995) and Merrimack Rivers (~ 100 adults) (M. Kieffer, United States Geological Survey, personal communication), and the largest populations are found in the Saint John (~ 100,000) (Dadswell 1979) and Hudson Rivers (~ 35,000) (Bain *et al.* 1995). Total instantaneous mortality rates (Z) are available for the Saint John River (0.12 - 0.15; ages 14-55) (Dadswell 1979), Upper Connecticut River (0.12) (Taubert 1980), and Pee Dee-Winyah River (0.08-0.12) (Dadswell *et al.* 1984). Total instantaneous natural mortality (M) for shortnose sturgeon in the lower Connecticut River was estimated to be 0.13 (T. Savoy, Connecticut Department of Environmental Protection, personal communication). There is no recruitment information available for shortnose sturgeon because there are no commercial fisheries for the species. Estimates of annual egg production for this species are difficult to calculate because females do not spawn every year (Dadswell *et al.* 1984). Further, females may abort spawning attempts, possibly due to interrupted migrations or unsuitable environmental conditions (NMFS 1998b). Thus, annual egg production is likely to vary greatly in this species.

Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They feed on a variety of benthic and epibenthic invertebrates including molluscs, crustaceans (amphipods, chironomids, isopods), and oligochaete worms (Vladykov and Greeley 1963; Dadswell 1979). Shortnose sturgeon are long-lived (30 years) and, particularly in the northern extent of their range, mature at late ages. In the north, males reach maturity at 5-10 years, while females mature between 7 and 13 years.

In the northern extent of their range, shortnose sturgeon exhibit three distinct movement patterns that are associated with spawning, feeding, and overwintering periods. In spring, as water temperatures rise above 8° C, pre-spawning shortnose sturgeon move from overwintering grounds to spawning areas. Spawning occurs from mid/late April to mid/late May. Post-spawned sturgeon migrate downstream to feed throughout the summer. As water temperatures drop below 8° C again in the fall, shortnose sturgeon move to overwintering concentration areas and exhibit little movement until water temperatures rise again in spring (Dadswell *et al.* 1984; NMFS 1998b). Young-of-the-year shortnose sturgeon are believed to move downstream after hatching (Dovel 1981) but remain within freshwater habitats. Older juveniles tend to move downstream in fall and winter as water temperatures decline and the salt wedge recedes. Juveniles move upstream in spring and feed mostly in freshwater reaches during summer.

Shortnose sturgeon spawn in freshwater sections of rivers, typically below the first impassable barrier on the river (*e.g.*, dam). Spawning occurs over channel habitats containing gravel, rubble, or rock-cobble substrates (Dadswell *et al.* 1984; NMFS 1998b). Additional environmental conditions associated with spawning activity include decreasing river discharge following the peak spring freshet, water temperatures ranging from 9 -12° C, and bottom water velocities of 0.4 - 0.7 m/sec (Dadswell *et al.* 1984; NMFS 1998b).

General human impacts and entanglement

The major known sources of anthropogenic mortality and injury of shortnose sturgeon include entrainment in dredges and entanglement in fishing gear. Entanglement could include incidental catch in commercial or recreational gear as well as directed poaching activities. This species may also be adversely affected by habitat degradation or exclusion associated with riverine maintenance and construction activities and operation of power plants. Shortnose sturgeon are most likely to interact with fisheries in and around the mouths of rivers where they are found. Thus interactions are more likely to occur in state fisheries or unregulated fisheries than in the EEZ. Interactions are most likely to occur during the spring migration (NMFS 1998b). According to information summarized in NMFS (1998b), operation of gillnet fisheries for shad may result in lethal takes of as many as 20 shortnose sturgeon per year in northern rivers. Shortnose sturgeon may be taken in ocean fisheries near rivers inhabited by this species. No comprehensive analysis of entanglement patterns is available at this time, in part due to the difficulty of distinguishing between shortnose and Atlantic sturgeon due to the similarity in appearance of these two species. For example, several thousand pounds of "sturgeon" were reported taken in the squid/mackerel/butterfish fishery in 1992; however, this information is not broken down by species. NMFS sea sampling coverage has recorded takes of shortnose sturgeon in the monkfish sink gillnet fishery.

Right Whale Critical Habitat

Scientists suspect that all habitats used by the northern right whale are not known at the present time. Genetics work performed by Schaeff *et al.* (1993) suggested the existence of at least one unknown nursery area. Within the known distribution of the species, however, the following five areas have been identified as critical to the continued existence of the species: (1) coastal Florida

and Georgia; (2) the Great South Channel, east of Cape Cod; (3) Cape Cod and Massachusetts Bays; (4) the Bay of Fundy; and (5) Browns and Baccaro Banks, south of Nova Scotia. The first three areas occur in U.S. waters and have been designated by NMFS as critical habitat (59 FR, 28793, June 3, 1994). This section focuses on the Cape Cod Bay and Great South Channel areas, which are the only components of right whale critical habitat within the action area.

The availability of dense concentrations of zooplankton blooms in the late winter (Cape Cod Bay) and spring (Great South Channel) is described as the key factor for right whale utilization of the areas. Kraus and Kenney (1991) provide an overview of data regarding right whale use of these areas. Important habitat components in Cape Cod Bay include seasonal availability of dense zooplankton patches and protection from weather afforded by the land masses surrounding the bay. The spring current regime and bottom topography of the Great South Channel result in nutrient rich upwelling conditions. These conditions support the dense plankton and zooplankton blooms utilized by right whales. The combination of highly oxygenated water and dense zooplankton concentrations are optimal conditions for the small schooling fishes (sand lance, herring, and mackerel) that prey upon some of the same zooplankton as right whales. Therefore, the abundance of these fishes may affect the availability of prey for right whales. The abundance of these fishes, in turn, may affect and be affected by the distribution of several piscivorous marine mammal species such as humpback, fin, minke, and pilot whales, Atlantic whitesided dolphins, and harbor porpoise. Concentrations of these species were observed in this region during the same spring period (CeTAP 1982).

Overfishing has severely reduced the stocks of several groundfish species such as cod, haddock, and yellowtail flounder. Recovery of commercially targeted finfish stocks from their current overfished condition may reduce the biomass of small schooling fish that feed directly on zooplankton resources throughout the region. It is unknown whether zooplankton densities that occur seasonally in Cape Cod Bay or the Great South Channel could be expected to increase significantly. However, increased predation by groundfish on small schooling fish in certain areas and at specific critical periods may allow the necessary high zooplankton densities to be maintained in these areas for longer periods, or accumulate in other areas at levels acceptable to right whales.

In 1997, NMFS, the U.S. Coast Guard, and the Commonwealth of Massachusetts began a program of monitoring the presence of right whales in an adjacent to the Cape Cod Bay and Great South Channel habitats for the purpose of reducing the potential for ship-whale collisions. Sightings in other parts of the Northeast have also been investigated. One such investigation revealed the presence of approximately 23 whales in one day off Rhode Island in an area of heavy shipping traffic. This monitoring program — initially called the Early Warning System (EWS) but recently renamed the Sighting Advisory System (SAS) — is described in more detail in the Environmental Baseline section. Important information has been collected through the SAS which may enable NMFS to identify additional critical habitat areas within Northeast waters as well as to refine the time and area boundaries of the known existing critical habitat areas and peak usage periods. The Environmental Baseline section also summarizes recent efforts in addressing the international component of the ship strike problem in the vicinity of right whale critical habitat.

ENVIRONMENTAL BASELINE

Environmental baselines for biological opinions include the past and present impacts of all state, federal or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR §402.02). The environmental baseline for this Biological Opinion includes the effects of several activities that may affect the survival and recovery of threatened and endangered species in the action area. The activities that shape the environmental baseline in the action area of this consultation generally fall into the following three categories: vessel operations, fisheries, and recovery activities associated with reducing those impacts. Other environmental impacts include effects of discharges, dredging, ocean dumping, sonic activity, and aquaculture.

Due to logistical difficulties caused by the in-water nature of the activities, especially offshore activities, and significant amount of resources necessary to design effective monitoring programs, monitoring of the impacts of these federal actions is not consistent for all species groups and all projects. For example, the most reliable assessment method for monitoring fishery interactions is the sea sampling program which provides random sampling of commercial fishing activities. However, due to the size, power, and mobility of whales, sea sampling is only effective for sea turtles and sturgeon. Although takes of whales are occasionally observed by the sea sampling program, levels of interaction with these species must be assessed primarily through receipt of opportunistic reports. It is often impossible to assign gear found on stranded or free-swimming animals to a specific fishery. Consequently, the total level of interaction is unknown.

A. Federal actions that have undergone formal or early Section 7 Consultation. NMFS has undertaken several ESA section 7 consultations to address the effects of vessel operations and gear associated with federally-permitted fisheries on threatened and endangered species in the action area. Each of those consultations sought to develop ways of reducing the probability of adverse impacts of the action on large whales and sea turtles. Similarly, recovery actions NMFS has undertaken under both the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1361 *et seq.*; MMPA) and the ESA are addressing the problem of take of whales in the fishing and shipping industries.

(1) *Vessel Operations*

Potential adverse affects from federal vessel operations in the action area of this consultation include operations of the U.S. Navy (USN) and the U.S. Coast Guard (USCG), which maintain the largest federal vessel fleets, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration (NOAA), and the Army Corps of Engineers (ACOE). NMFS has conducted formal consultations with the USCG, the USN (described below) and is currently in early phases of consultation with the other federal agencies on their vessel operations. In addition to operation of ACOE vessels, NMFS has consulted with the ACOE to provide recommended permit restrictions for operations of contract or private vessels around whales. Through the section 7 process, where applicable, NMFS has and will continue to establish conservation

measures for all these agency vessel operations to avoid adverse effects to listed species. At the present time, however, they represent potential for some level of interaction. Refer to the Biological Opinions for the USCG (September 15, 1995 , July 22, 1996, and June 8, 1998) and the USN (May 15, 1997) for detail on the scope of vessel operations for these agencies and conservation measures being implemented as standard operating procedures.

Since the USN consultation only covered operations out of Mayport, Florida, potential still remains for USN vessels to adversely affect large whales when they are operating in other areas within the range of these species. Similarly, operations of vessels by other federal agencies within the action area (NOAA, EPA, ACOE) may adversely affect whales. However, the in-water activities of those agencies are limited in scope, as they operate a small number of vessels or are engaged in research/operational activities that are unlikely to contribute a large amount of risk. Through the consultation process, conservation recommendations will be provided to further reduce the potential for adverse impacts.

(2) Federal Fishery Operations

Several commercial fisheries operating in the action area use gear which is known to take listed species. Efforts to reduce the adverse effects of commercial fisheries are addressed through both the MMPA take reduction planning process and the ESA section 7 process. Federally regulated gillnet, longline, trawl, seine, dredge, and pot fisheries have all been documented as interacting with either whales or sea turtles or both. Other gear types are known to impact whales as well. For all fisheries for which there is a federal fishery management plan (FMP) or for which any federal action is taken to manage that fishery, impacts have been evaluated through the section 7 process.

Several formal ESA section 7 consultations have been conducted on the following fisheries which may adversely affect threatened and endangered species: American Lobster, Northeast Multispecies, Monkfish, Atlantic Pelagic Swordfish/Tuna/Shark, Summer Flounder/Scup/ Black Sea Bass, and Atlantic Mackerel/Squid/Atlantic Butterfish fisheries. These consultations are summarized below; for more detailed information, refer to the respective Biological Opinions.

The *American Lobster pot fishery* is the largest fixed gear fishery in the action area. This fishery is known to take endangered whales and sea turtles. NMFS recently reinitiated formal consultation on the federally regulated lobster fishery to consider potential effects of the transfer of management authority from the Magnuson-Stevens Act to the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA), the implementation of new lobster management actions under the ACFCMA, and recent takes of endangered whales in the fishery. The previous formal consultation on the fishery under the MSFCMA had reached a jeopardy conclusion for the northern right whale with the Biological Opinion issued December 13, 1996. As a result of the Reasonable and Prudent Alternative (RPA) included with the 1996 Biological Opinion, an emergency regulation under the MMPA (Emergency Interim Final Rule, 62 FR 16108) was published implementing restrictions on the use of lobster pot gear in the federal portion of the Cape Cod Bay right whale critical habitat and in the Great South Channel right whale critical habitat during periods of expected peak right whale abundance.

The proposed ACFCMA plan contains measures to limit the number of lobster traps that can be deployed during the first two years of the plan, and further trap reduction measures may be chosen as default effort reduction measures during subsequent plan years. The reduction in the number of traps fished is expected to result in a reduction of entanglement risk. The interaction between the lobster trap fishery and endangered whales is addressed in the ALWTRP, which was implemented on November 15, 1997. The ALWTRP incorporated the RPA issued with the 1996 Biological Opinion and implemented additional restrictions. Because of the greater protection provided by the ALWTRP, NMFS substituted the ALWTRP for the RPA issued with the 1996 Biological Opinion and has concluded that the lobster fishery in the context of the ALWTRP may adversely affect but is not likely to jeopardize the northern right whale. Additional description of the ALWTRP is provided below.

The *Northeast Multispecies sink gillnet fishery* is one of the other fisheries in the action area of this consultation that is known to entangle whales and sea turtles. This fishery has historically occurred along the northern portion of the action area for this Biological Opinion from the periphery of the Gulf of Maine to Rhode Island in water to 60 fathoms. In recent years, more of the effort in this fishery has occurred in offshore waters and into the Mid-Atlantic. Participation in this fishery declined from 399 to 341 permit holders in 1993 and has declined further since extensive groundfish conservation measures have been implemented. Based on 1996 data, NMFS estimated that there were 273 participants in the northeast sink gillnet fishery as defined under the MMPA, which includes not only multispecies vessels, but also those using sink gillnet gear to target other species such as monkfish and dogfish. The fishery operates throughout the year with peaks in the Spring and from October through February. Data indicate that gear used in this fishery has seriously injured northern right whales, humpback whales, fin whales, and loggerhead and leatherback sea turtles.

The *Monkfish Fishery Management Plan* was recently completed by the New England and Mid-Atlantic Fishery Management Councils. The monkfish fishery uses several gear types which may entangle protected species, and takes of shortnose sturgeon and sea turtles have been recorded from monkfish trips. The monkfish gillnet sector is included in either the northeast sink gillnet or mid-Atlantic coastal gillnet fisheries and is therefore regulated by the Atlantic Large Whale and Harbor Porpoise Take Reduction Plans. NMFS completed a formal consultation on the Monkfish FMP on December 21, 1998, which concluded that the fishery, with modification under the take reduction plans, is not likely to jeopardize listed species or adversely modify critical habitat.

Different components of the *Atlantic Pelagic Fishery for swordfish/tuna/shark* in the EEZ have occurred within the action area for this consultation. Use of pelagic longline, pelagic driftnet, bottom longline, hand line (including bait nets), and/or purse seine gear in this fishery has resulted in the take of sea turtles and/or whales. Bycatch estimates from the observations of sea turtle takes in the longline fishery number in the thousands, and significant efforts are underway to evaluate gear and fishing practice modifications that will decrease the number of interactions. Sea turtles were also taken in an experimental pelagic pair trawl fishery for tunas in the mid-1990s; this experimental fishery has been discontinued. A list of allowable gear types for FMP and non-FMP species, including HMS species, was published in early 1999 (64 FR 4030). That list does not authorize the use of any kind of trawl gear by vessels targeting HMS species.

The driftnet portion of the fishery was prohibited during an emergency closure that began in December 1996, extended through May 31, and was subsequently extended for another six months. Therefore, the fishery did not operate between December 1996 and July 31, 1998. An extensive environmental assessment (NMFS 1999b) was prepared to evaluate this fishery from both a fisheries and protected species perspective. The northeast swordfish driftnet segment was reopened on August 1, 1998. A final rule to prohibit the use of driftnet gear in the swordfish fishery was published on January 27, 1999 (64 FR 4055). A final rule implementing a new comprehensive FMP for the whole pelagic fishery, which incorporates the driftnet closure, was published on May 28, 1999 (64 Fr 29090). A Biological Opinion on this rule, completed on April 9, 1999, concluded that the operation of the fishery, as modified by the portions of the ALWTRP pertaining to shark driftnet gear, may adversely affect but is not likely to jeopardize the continued existence of listed species. The Opinion also concluded that the fishery will not result in adverse modification of critical habitat.

The *Atlantic Large Whale Take Reduction Plan*, which was implemented on November 15, 1997, pursuant to the MMPA, includes restrictions on the American lobster, northeast multispecies, monkfish, and Atlantic pelagic fisheries described above as well as the mid-Atlantic coastal gillnet fishery as defined under the MMPA. This plan is designed to reduce the rate of serious injury and mortality of right, humpback, fin, and minke whales incidental to the northeast sink gillnet, lobster pot, southeast shark gillnet, and mid-Atlantic gillnet fisheries to acceptable removal levels as defined in the MMPA. An informal section 7 consultation was conducted on this plan — and on the operation of the four fisheries regulated by the plan — and concluded, on July 15, 1997, that the implementation of the ALWTRP and continued operation of these fisheries may adversely affect, but is not likely to jeopardize the continued existence of any listed species of large whales or sea turtles under NMFS jurisdiction. The primary take reduction measures of the plan include closures and modification of fishing gear and practices to reduce the adverse impacts of entanglement. NMFS completed an updated informal consultation on this action on February 3, 1999, to incorporate changes in the final rule, which was published February 16, 1999 (64 FR 7529). The ALWTRP is designed to implement restrictions over several years as necessary to reach the ultimate plan goals. Consultation on this take reduction plan will be reinitiated as each segment of the plan is developed.

The *Summer Flounder, Scup and Black Sea Bass fisheries* are known to interact with sea turtles. While not documented, the gillnet portion of this fishery could entangle endangered whales, particularly humpback whales. The pot gear and staked trap sectors could also entangle whales and sea turtles. Significant measures have been developed to reduce the take of sea turtles in summer flounder trawls and trawls that meet the definition of a summer flounder trawl (which would include fisheries for other species like scup and black sea bass) by requiring Turtle Excluder Devices (TED) in nets in the area of greatest bycatch off the North Carolina coast. NMFS is considering a more geographically inclusive regulation to require TEDs in trawl fisheries that overlap with sea turtle distribution to reduce the impact from this fishery. Developmental work is also ongoing for a TED that will work in the flynets used in the weakfish fisheries. The gillnet sector of this fishery is subject to the requirements of the ALWTRP and HPTRP as appropriate through restrictions on the MMPA listings for the northeast sink gillnet fishery and/or mid-Atlantic coastal gillnet fishery.

On April 28, 1999, NMFS completed a formal consultation on the *Atlantic Mackerel /Squid /Atlantic Butterfish fishery*. This fishery is known to take sea turtles and may occasionally interact with whales and shortnose sturgeon. The Northeast Fisheries Science Center is currently conducting a sea turtle bycatch review to provide information on entanglement patterns in this and other fisheries in the action area. Gillnet sectors of this fishery are subject to the requirements of the ALWTRP and HPTRP as appropriate.

Fishing vessel effects: other than entanglement in fishing gear, effects of fishing vessels on listed species may involve disturbance or injury/mortality due to collisions or entanglement in anchor lines. Listed species or critical habitat may also be affected by fuel oil spills resulting from fishing vessel accidents. No incidences of collisions between commercial fishing vessels and listed species or adverse effects resulting from disturbance have been documented. However, the commercial fishing fleet represents a significant portion of marine vessel activity. For example, more than 280 commercial fishing vessels fish on Stellwagen Bank in the Gulf of Maine. In addition, commercial fishing vessels may be the only vessels active in some areas, particularly in cooler seasons. Therefore, the potential for collisions exists. Due to differences in vessel speed, collisions during fishing activities are less likely than collisions during transit to and from fishing grounds. Because most fishing vessels are smaller than large commercial tankers and container ships, collisions are less likely to result in mortality. Although entanglement in fishing vessel anchor lines has been documented historically, no information is available on the prevalence of such events. Fuel oil spills could affect animals directly or indirectly through the food chain. Fuel spills involving fishing vessels are common events. However, these spills typically involve small amounts of material that are unlikely to adversely affect listed species. Larger spills may result from accidents, although these events would be rare and involve small areas. No incidences of direct adverse effects on listed species or critical habitat resulting from fishing vessel fuel spills have been documented. Given the current lack of information on prevalence or impacts of interactions, there is no reason to assume that the level of interaction represented by any of the various fishing vessel activities discussed in this section would be detrimental to the recovery of listed species.

B. State or private actions

(1) *Private and Commercial Vessels*

Private and commercial vessels operate in the action area of this consultation and also have the potential to interact with whales and sea turtles. For example, shipping traffic in Massachusetts Bay is estimated at 1,200 ship crossings per year with an average of 3 per day. Sportfishing contributes more than 20 vessels per day from May to September on Stellwagen Bank in the Gulf of Maine. Similar traffic may exist in many other areas within the scope of this consultation which overlap whale high-use areas. The invention and popularization of new technology resulting in high speed catamarans for ferry services and whale watch vessels operating in congested coastal areas contributes to the potential for impacts from privately-operated vessels in the environmental baseline. Recent federal efforts regarding mitigating impacts of the whale watch and shipping industries on endangered whales are discussed in Section C below.

In addition to commercial traffic and recreational pursuits, private vessels participate in high speed marine events concentrated in the southeastern U.S. that are a particular threat to sea

turtles. The magnitude of these marine events is not currently known. NMFS and the USCG are in early consultation on these events, but a thorough analysis has not been completed. The STSSN also reports many records of vessel interaction (propeller injury) with sea turtles off the New Jersey coast.

Other than injuries and mortalities resulting from collisions, the effects of disturbance caused by vessel activity on listed species is largely unknown. Although the difficulty in interpreting animal behavior makes studying the effects of vessel activities problematic, attempts have been made to evaluate the impacts of vessel activities such as whale watch operations on whales in the Gulf of Maine. However, no conclusive detrimental effects have been demonstrated.

(2) *State fishery operations*

Very little is known about the level of take in fisheries that operate strictly in state waters. However, depending on the fishery in question, many state permit holders also hold federal licenses; therefore, section 7 consultations on federal action in those fisheries address some state-water activity. Impacts on sea turtles and shortnose sturgeon from state fisheries may be greater than those from federal activities in certain areas due to the distribution of these species. Impacts of state fisheries on endangered whales are addressed as appropriate through the MMPA take reduction planning process. NMFS is actively participating in a cooperative effort with the ASMFC and member states to standardize and/or implement programs to collect information on level of effort and bycatch of protected species in state fisheries. When this information becomes available, it can be used to refine take reduction plan measures in state waters. With regard to whale entanglements, vessel identification is occasionally recovered from gear removed from entangled animals. With this information, it is possible to determine whether the gear was deployed by a federal or state permit holder and whether the vessel was fishing in federal or state waters. In 1998, 3 entanglements of humpback whales in state-water fisheries were documented. Nearshore entanglements of turtles have been documented. However, information is not available on whether the vessels involved were permitted by the state or by NMFS.

In December 1997, the Atlantic States Marine Fisheries Commission adopted *Amendment 3 to the Coastal Fishery Management Plan for American Lobster* (ASMFC 1997). The proposed federal ACFCMA plan is designed to be complementary to the ASMFC plan, and the two plans are largely similar in structure. Regulations will be geared toward reducing lobster fishing effort by 2005 to reverse the overfished status of the resource. Amendment 3 contained the outline of a long-term plan with annual targets during the rebuilding period and initial effort reduction measures for some areas. However, the development of most of the specific effort reduction measures necessary to meet the annual targets was left to the deliberations of the Lobster Conservation Management Teams (LCMT) established for each of the 7 areas. States in the 6 coastal areas must implement regulations according to a compliance schedule established in Amendment 3. Effort reduction measures will be similar to those discussed in the federal ACFCMA plan. Several states implemented trap caps in 1998. Further trap limits, which the compliance schedule requires for Area 1 and the Outer Cape Lobster Management Area in 1999, will generate some localized risk reduction for protected species in those areas. If all states elect to implement a significant trap reduction program, the overall entanglement risk from lobster pot gear could be substantially reduced. For the Amendment 3 measures not yet implemented, the

ASMFC has recently conducted public hearings on the first half of the area-based effort reduction measures developed by LCMTs. The ASMFC will conduct public hearings and develop the second part of the remaining measures in the fall of 1999. As the definition of the fishery in the MMPA includes state water effort, vessels fishing in state waters will be required to comply with MMPA take reduction plan regulations designed to reduce entanglement risk to whales.

Early in 1997, the *Commonwealth of Massachusetts* implemented restrictions on lobster pot gear in the state water portion of the Cape Cod Bay critical habitat during the January 1 - May 15 period to reduce the impact of the fishery on northern right whales. The regulations were revised prior to the 1998 season. State regulations impact state permit holders who also hold federal permits, although effects would be similar to those resulting from federal regulations during the January 1 - May 15 period. Massachusetts has also implemented Winter/Spring gillnet restrictions similar to those in the ALWTRP and the MSA for the purpose of right whale and/or harbor porpoise conservation.

In October 1998, the ASMFC approved a new *Atlantic herring plan and Amendment 1 to the plan*, which is complementary to the Council FMP and includes similar measures for permitting, recordkeeping/reporting, area-based management, sea sampling, TAC management, effort controls, use restrictions, and vessel size limits as well as measures addressing spawning area restrictions, directed mealing, the fixed gear fishery, and internal waters processing (IWP) operations (transfer of fish to a foreign processor in state waters). The ASMFC plan, implemented through regulations promulgated by member states, is expected to affected listed species and critical habitat in a manner similar to the federal FMP.

C. Conservation and recovery actions shaping the environmental baseline

1. Whales

In 1994, NMFS established The Northeast Implementation Team (NEIT) for the right and humpback whale Recovery Plans. This team is comprised of federal and state regulatory agencies, some of which are specifically mentioned in the Recovery Plans, and is advised by a panel of scientists with expertise in right and humpback whale biology. The Recovery Plans describe steps to reduce the impacts to levels that will allow the two species to recover and rank the various recovery actions in order of importance. The NEIT provides advice to the various federal and state agencies or private entities on achieving these national goals within the Northeast Region. The NEIT agreed to focus on habitat and vessel related issues and rely on the take reduction planning process under the MMPA for reducing takes in commercial fisheries. Through the deliberations of the NEIT, NMFS has implemented a number of activities that ameliorate some of the potential threat from the aforementioned state, federal, and private activities.

Education and outreach are considered one of the primary tools to reduce the threat of impact from private and commercial vessel operations. The USCG has provided education to mariners on whale protection measures and uses their programs — such as radio broadcasts and notice to

mariner publications — to alert the public to potential whale concentration areas. The USCG is also participating in international activities (discussed below) to decrease the potential for commercial ships to strike a whale. Recently, an educational video on the ship strike problem was produced and will be made available to mariners. In addition, outreach efforts under the ALWTRP for fishermen are also increasing awareness and fostering a conservation ethic among fishermen that is expected in the long run to help reduce overall probability of adverse impacts in the environmental baseline from activities that operate vessels on the water.

The *Northeast Sighting Advisory System (SAS):* This program, originally called an "early warning system", was designed to document the presence of right whales in and around critical habitat and nearby shipping/traffic separation lanes in order to avert ship strikes. Through a fax-on-demand system, fishermen and other vessel operators can obtain SAS sighting reports and, in some cases, make necessary adjustments in operations to decrease the potential for interactions with right whales. The SAS activity has also served as the only form of active entanglement monitoring in the critical habitat areas, and several entanglements in both the Cape Cod Bay and Great South Channel areas have been reported by SAS flights. Some of these sighting efforts have resulted in successful disentanglement of right whales. SAS flights have also contributed sightings of dead floating animals that can occasionally be retrieved to increase our knowledge of the biology of the species and effects of human impacts. The Commonwealth of Massachusetts was a key collaborator in the 1996-1997 SAS pilot effort and has continued the partnership. The USCG has also played a vital role in this effort, providing both air and sea support as well as a commitment of resources to the NMFS operations. The State of Maine and Canada Department of Fisheries and Oceans have expressed interest in conducting this type of program along their coastal waters. It is expected that other potential sources of sightings such as the U.S. Navy may contribute to this effort following NMFS' commitment to support the program over the long term. Due to increased awareness, U.S. Navy vessels have contributed several sightings of entangled and dead floating animals in recent years. The NMFS Maine ALWTRP Coordinator is also working with local aquaria to collect whale sightings from fishing vessels in the Gulf of Maine. All this cooperation will increase the chance of success of this program in diverting potential impacts in the environmental baseline.

As part of recovery actions aimed at reducing vessel-related impacts, NMFS published a proposed rule in August 1996 restricting vessel approach to right whales (61 FR 41116) to distances outside of 500 yards in order to minimize human-induced disturbance. The Recovery Plan for the Northern Right Whale identified disturbance as one of the principal human-related factors impeding right whale recovery (NMFS 1991b). Following public comment, NMFS published an interim final rule in February 1997 codifying the regulations. With certain exceptions, the rules prohibit both boats and aircraft from approaching any right whale closer than 500 yds. Exceptions for closer approach are provided for the following situations when: (a) compliance would create an imminent and serious threat to a person, vessel, or aircraft; (b) a vessel is restricted in its ability to maneuver around the 500-yard perimeter of a whale; (c) a vessel is investigating or involved in the rescue of an entangled or injured right whale, or (d) the vessel is participating in a permitted activity, such as a research project. If a vessel operator finds that he or she has unknowingly approached closer than 500 yds, the rule requires that a course be steered away from the whale at slow, safe speed. Exceptions are made for emergency situations

and where certain authorizations are provided. In addition, all aircraft, except those involved in whale watching activities, are excepted from these approach regulations. The regulations are consistent with the Commonwealth of Massachusetts' approach regulations for right whales. These are expected to reduce the potential for vessel collisions in the environmental baseline.

As part of NEIT activities, a Ship Strike Workshop was held in December 1996 to inform the shipping community of their need to participate in efforts to reduce the impacts of commercial vessel traffic on northern right whales. The workshop summarized current research efforts using new shipboard and moored technologies as deterrents, and a report was given on ship design studies currently being conducted by the New England Aquarium and Massachusetts Institute of Technology. This workshop increased awareness among the shipping community and has further contributed to reducing the threat of ship strikes of right whales. In addition, a Cape Cod Canal Tide Chart that included information on critical habitat areas and the need for close watch during peak right whale activity was distributed widely to professional mariners and ships passing through the canal. A radio warning transmission was also transmitted by Canal traffic managers to vessels transiting the Canal during peak Northern right whale activity periods. Follow-up meetings were held with New England Port Authority and pilots to notify commercial ship traffic to keep a close watch during peak right whale movement periods. In response to current needs, the NEIT is reconfiguring its ship strike subcommittee to address these impacts on a more formal basis.

In April 1998, the USCG submitted, on behalf of the United States, a proposal to the International Maritime Organization (IMO) requesting approval of a mandatory ship reporting system (MSR) in two areas off the east coast of the United States. The USCG worked closely with NMFS and other agencies on technical aspects of the proposal The proposal was submitted to the IMO's Subcommittee on Safety and Navigation for consideration and submission to the Marine Safety Committee at IMO and approved in December 1998. The USCG and NOAA will play important roles in helping to operate the MSR system, which will be implemented on July 1, 1999.

Through deliberations of the NEIT and its Ship Strike Committee, NMFS and the National Ocean Service (NOS) recently revised the whale watch guidelines for the Northeast, including the Studds-Stellwagen National Marine Sanctuary. Addition NEIT recommendations regarding whale watching activities are under discussion.

The NEIT also has a Habitat Committee which deals with issues of habitat quality. The Committee was actively involved in commenting on several activities such as a new sewage outfall system. In addition, planning is underway for a food web study to provide better understanding of whale prey resource requirements and how activities such as the sewage outfall might affect the availability of plankton resources to feeding right whales in the Gulf of Maine.

2. Sea Turtles

NMFS has implemented a series of regulations aimed at reducing potential for incidental mortality of sea turtles in commercial fisheries. In particular, NMFS has required the use of

TEDs in southeast U.S. shrimp trawls since 1989 and in summer flounder trawls in the Mid-Atlantic area (south of Cape Henry, Virginia) since 1992. It has been estimated that TEDs exclude 97% of the turtles caught in such trawls. These regulations have been refined over the years to ensure that TED effectiveness is maximized through proper placement and installation, configuration (*e.g.*, width of bar spacing), floatation, and more widespread use. However, with the expansion of fisheries to previously underutilized species of fish, trawl effort directed at species other than summer flounder — and that does not meet the definition of a summer flounder trawl as specified in the TED regulations — may be an undocumented source of mortality for which TEDs should be considered.

In 1993 (with a final rule implemented 1995), NMFS established a Leatherback Conservation Zone to restrict shrimp trawl activities from off the coast of Cape Canaveral, Florida, to the North Carolina/Virginia border. This provides for short-term closures when high concentrations of normally pelagically distributed leatherbacks are recorded in more coastal waters where the shrimp fleet operates. This measure is necessary because, due to their size, adult leatherbacks are larger than the escape openings of most NMFS-approved TEDs.

NMFS is also working to develop a TED which can be effectively used in a type of trawl known as a flynet, which is sometimes used in the mid-Atlantic and northeast fisheries for summer flounder, scup, and black sea bass. If observer data conclusively demonstrate a need for such TEDs, regulations will be formulated to require use of TEDs in this fishery, once such a device has been developed.

In addition, NMFS has been active in public outreach efforts to educate fishermen regarding sea turtle handling and resuscitation techniques. As well as making this information widely available to all fishermen, over the past year NMFS has conducted workshops with longline fishermen to discuss bycatch issues including protected species, and to educate them regarding handling and release guidelines. NMFS intends to continue these outreach efforts and hopes to reach all fishermen participating in the pelagic longline fishery over the next one to two years.

There is an extensive network of sea turtle stranding and salvage network (STSSN) participants along the Atlantic and Gulf of Mexico coasts which not only collects data on dead sea turtles, but also rescues and rehabilitates live stranded turtles. Data collected by the STSSN are used to monitor stranding levels and compare them with fishing activity in order to determine whether additional restrictions on fishing activities are needed. These data are also used to monitor incidence of disease, study toxicology and contaminants, and conduct genetic studies to determine population structure. All of the states that participate in the STSSN are collecting tissue for and/or conducting genetic studies to better understand the population dynamics of the small subpopulation of northern nesting loggerheads. These states also tag turtles as live ones are encountered (either via the stranding network through incidental takes or in-water studies). Tagging studies help provide an understanding of sea turtle movements, longevity, reproductive patterns, etc.

There is currently no organized, formal program for at-sea disentanglement of sea turtles. However, recommendations for such programs are being considered by NMFS pursuant to

conservation recommendations issued with several recent section 7 consultations. Entangled sea turtles found at sea in recent years have been disentangled by STSSN members, the whale disentanglement team, the USCG, and fishermen.

D. Other potential sources of impacts in the baseline.

A number of anthropogenic activities that may indirectly affect listed species in the action area of this consultation include discharges from wastewater systems, dredging, ocean dumping and disposal, sonic activities, and aquaculture. The impacts from these activities are difficult to measure. Where possible, however, conservation actions are being implemented to monitor or study impacts from these elusive sources. For example, extensive monitoring is being required for a major discharge in Massachusetts Bay (Massachusetts Water Resources Authority) in order to detect any changes in habitat parameters, because it is located in close proximity to Massachusetts Bay. Close coordination is occurring through the section 7 process on both dredging and disposal sites to develop monitoring programs and ensure that vessel operators do not contribute to vessel-related impacts.

NMFS and the U.S. Navy have been working cooperatively to establish a policy for monitoring and managing *Acoustic Impacts from Anthropogenic Sound Sources* in the marine environment. Acoustic impacts can include temporary or permanent injury, habitat exclusion, habituation, and disruption of other normal behavior patterns. It is expected that the policy on managing anthropogenic sound in the oceans will provide guidance for programs such as the use of acoustic deterrent devices in reducing marine mammal-fishery interactions and review of federal activities and permits for research involving acoustic activities. The Office of Naval Research hosted a meeting in March 1997 to develop scientific and technical background for use in policy preparation. NMFS hosted a workshop in September 1998 to gather technical information which will support development of new acoustic criteria.

Aquaculture is currently not concentrated in whale high use areas, but some projects have begun in Cape Cod Bay Critical Habitat and in other inshore areas off the Massachusetts and New Hampshire coast. Acknowledging that the potential for impacts is currently unknown, NMFS is coordinating research to measure habitat related changes in Cape Cod Bay and is ensuring that these facilities do not contribute to the entanglement potential in the baseline through the section 7 process. Many applicants have agreed to alter the design of their facilities to minimize or eliminate the use of lines to the surface that may entangle whales and/or sea turtles.

The *Massachusetts Environmental Trust and Massachusetts Division of Marine Fisheries* have funded several projects to investigate fixed fishing gear and potential modifications to reduce the risk of entanglement to whales. These projects are an important complement to the NMFS research effort and have yielded valuable information on the entanglement problem. The Trust has also funded research on right whales in the Cape Cod Bay critical habitat area.

In summary, many of the activities that form the Environmental Baseline for the proposed action adversely affect threatened and endangered whales, sea turtles, and sturgeon in the action area.

Of the threatened and endangered species that may be adversely affected by the proposed action, NMFS has the greatest concern for the endangered northern right whale. Analyses of the best scientific and commercial data available suggests the northern right whale population is declining, with declining survival rates and increasing intervals between births. Although all of the causes of this increase in deaths are unknown, deaths accompanying collisions with ships accounted for 35 percent of the known mortalities between 1970 and 1997, while entanglement in fishing gear accounted for 5 percent of the deaths. Based on an evaluation of current vital rates of the northern right whale population, Caswell et al. (1999) estimated a mean time to extinction of 191 years, with a median of 182 years. Improvements in the vital rates of the northern right whales could extend this estimated time to extinction; conversely, declines in vital rates could reduce the estimated time to extinction. It is clear that entanglement in fishing gear associated with fisheries included in this *Environmental Baseline* pose a danger to the survival and recovery of the northern right whale and that continued reductions in the risk of such entanglements would be prudent, given the status of the right whale population.

Within the action area, NMFS and other agencies have taken several actions aimed at reducing interactions between ships and endangered whales and entanglements in fishing gear within the action area of this consultation. In particular, the ALWTRP is designed to mitigate or eliminate the adverse effects of fishery-related entanglements on threatened and endangered marine mammals. The Northeast Implementation Team continues to focus on ship-strike and habitat-related issues in the action area. The prognosis for listed whales, particularly the northern right whale, partially depends on whether the ALWTRP, as implemented, will effectively reduce incidental mortality and serious injury of whales to levels approaching a zero rate of mortality or serious injury. The take reduction plan will be reviewed annually; if those reviews determine that the plan is not making appreciable progress toward achieving this goal, this assumption may need to be re-evaluated.

The endangered shortnose sturgeon occurs in the action area for the proposed action, but is not likely to be adversely affected by the proposed herring fishery because it is limited to the rivers, estuaries, and nearshore waters of the action area and, therefore, is not likely to be adversely affected by offshore fisheries. At the same time, fisheries operating in state waters within the action area are more likely to interact with this species if effort occurs near the mouth of sturgeon rivers, although specific impacts of state fisheries on this species are unknown.

EFFECTS OF THE ACTION

This section of a Biological Opinion assesses the direct and indirect effects of the proposed action on threatened and endangered species or critical habitat, together with the effects of other activities that are interrelated or interdependent (50 CFR 402.02). Indirect effects are those that are caused later in time, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration (50 CFR 402.02).

Several protected species impact assessment documents prepared by NMFS or the Council have bearing on this analysis. An assessment of impacts of the herring fishery on endangered and threatened species of whales, sea turtles, and fish is presented in the EIS prepared by the Council (NEFMC 1999). Additional discussion of entanglement in gear types similar to those used in the herring fishery was provided in the EISs prepared for the Amendments 5 and 7 to the Multispecies FMP, the 1989-1996 Biological Opinions on the Multispecies FMPs, the EA contained in Framework Adjustment 23 to the Multispecies FMP restricting the multispecies gillnet fishery in the northeast right whale critical habitat areas (NMFS 1997a), and the EA and subsequent section 7 consultation prepared for the Atlantic Large Whale Take Reduction Plan (NMFS 1997b and c, respectively) interim final rule.

Listed species and/or critical habitat may be directly affected by fishing activities authorized under the Herring FMP through incidental take or indirectly by effects on prey resources. Incidental take could include injury or mortality resulting from entanglement, entrapment, disturbance, or collisions between fishing vessels and listed species. Effects on prey resources could result from competition between the fishery and piscivorous whales or between planktivorous whales and herring.

A. Spatial and Temporal Overlap

The potential for direct interaction between a fishery and listed species is limited by the degree of spatial and temporal overlap, while indirect effects could occur over a broader range of areas and times. A detailed analysis of overlap between the herring fishery and listed species is not available at this time. However, some qualitative statements can be made based on current knowledge on the distribution of herring and listed species. The herring resource is widely distributed in the action area and overlaps the distribution of all listed species considered in this consultation to a certain extent. The greatest overlap between current fishing effort and endangered whales is for humpback and fin whales during the months of April through November. Sea turtles are most likely to interact with the fishery during the months of June through October. Therefore, it is likely that interactions between the fishery and those species would be most pronounced during those periods.

The herring fishery is targeting a primary prey species for many marine mammals in the Northeast Continental Shelf ecosystem; humpback and fin whales are known to prey upon herring. The degree to which sea turtles and shortnose sturgeon prey upon herring is unknown, but it is unlikely that herring is an important prey item for any of these other listed species. The overlap in target species between piscivorous whales and the fishery increases the potential for interaction. Observations of humpback whales using the same area as herring purse seine vessels on Jeffreys Ledge in the summer from 1992-1994 were reported by Weinrich *et al.* (1997). Observers deployed in a study conducted in 1997 and 1998 by the Maine Department of Marine Resources (DMR) reported sightings of several marine mammal species, including minke, humpback, and fin whales, in the vicinity of herring operations. Since fishing occurred primarily at night, reliable estimates of number of sightings cannot be provided. Direct, active overlap between the herring fishery and both humpback and fin whales has also been reported in Canadian waters (D. Mattila and M. Brown, pers. comm.). Observations of apparent feeding

associations of humpback and fin whales, as well as other marine mammal species, with trawl operations were also reported in Fertl and Leatherwood (1997).

B. Interactions with Herring Gear and Herring Vessels

Herring Gear

NMFS currently authorizes the use of trawl, purse seine, and gillnet gear in the commercial herring fishery (64 FR 4030). The deployment of gear used in the herring fishery could adversely affect listed species through entanglement, entrapment, or interference with feeding. There is no direct evidence of takes of listed species in the herring fishery from the NMFS sea sampling program. The amount of monitoring of this fishery is minimal, and the degree to which existing coverage has tracked the current fishery or incidental take patterns is unknown. From January 1989 through September 1998, the NMFS Sea Sampling program covered approximately 71 hauls in trawl fisheries targeting herring and numerous hauls targeting other species where more than 150 lbs. of herring were caught. No takes of listed species were observed. The Maine DMR study discussed earlier covered 27 midwater trawl trips (54 individual hauls), including 11 pair trawl trips, and 23 purse seine trips (50 individual sets) (Stevenson and Scully 1999). Although endangered whales were sighted in conjunction with fishing operations, no entanglements of these species were observed (D. Stevenson, pers. comm.). No interactions with sea turtles or shortnose sturgeon were reported. The only marine mammal entanglement observed involved one lethal take of a harbor seal in a pair trawl trip off Portland, Maine, in October 1997 (Stevenson 1998).

The only record of an entanglement of ESA-listed species in gear targeting herring is the entanglement of a humpback whale calf in the buoy line of a bait gillnet set to catch herring for the bluefin tuna hand line fishery. Although little direct evidence of entanglement in herring gear is available, indirect evidence supporting the potential for interaction can be drawn from other fisheries. Takes of whales, sea turtles, and sturgeon have been recorded in the action area in one or more of the gear types used in the herring fishery.

There are no data available that can be used to estimate the number of threatened or endangered whales that might be taken in herring gear. Because the proposed herring fishery has the greatest spatial and temporal overlap with the distribution of humpback and fin whales, these are the species most likely to be adversely affected through interactions with the proposed fishery. The potential for adverse affects is increased because these two whales prey upon herring. However, observations of interactions between whales and fishing vessels in other herring fisheries has produced no evidence that the fishery adversely affects either whale species. Although it would be reasonable to expect some interactions in the future, particularly possible entanglements, it is impossible to determine the probability of such an interaction. Using the information available from the NMFS Sea Sampling program, NMFS expects interactions to be rare. As a result, NMFS does not believe it would be reasonable to expect the proposed herring fishery would be likely to appreciably reduce the likelihood of the survival and recovery of the endangered humpback or fin whales in the wild.

Similarly, there are no data available that can be used to estimate the number of threatened or endangered sea turtles that might be taken in herring gear; nevertheless, based on observed takes from Sea Sampling data from other fisheries for gear types that may be used in the herring fishery, NMFS believes it would be reasonable to expect, as a precaution, 6 loggerhead sea turtles to be taken by the proposed fishery (3 of these takes would be lethal) and 1 green sea turtle, Kemp's ridley sea turtle, and leatherback sea turtle to be taken by the proposed fishery. Based on the information available on the distribution and abundance of these sea turtle species in the action area, NMFS does not believe the death, capture, or injury of these small numbers of sea turtles would appreciably diminish the viability of sea turtle populations in the action area. Further, NMFS does not believe it would be reasonable to expect the death, capture, harm, or harassment of these numbers of sea turtles would appreciably reduce the likelihood of survival and recovery or these species in the wild.

Because of similarity in appearance with the Atlantic sturgeon, *Acipenser oxyrinchus*, movements of shortnose sturgeon in federal waters are poorly understood at this time. The difficulty in distinguishing between the two species may also influence rates of reporting of incidental take. However, available information suggests that shortnose sturgeon do not disperse extensively into federal waters. Since the majority of herring are caught in federal waters, it is unlikely that interactions with shortnose sturgeon will occur.

The following discussion uses information on takes in other fisheries presented in the species status sections of this document to assess potential for entanglement in the gear types used in the herring fishery.

Gillnet gear: although gillnet gear is not a primary gear type for vessels whose primary target species is herring, it is one of the primary gear types used to catch herring as bait for other fisheries such as the lobster pot fishery and tuna hand line/rod and reel fisheries. (Further description of the bait gillnet fisheries is provided in the section of this document describing the current herring fishery.) Because the tuna and lobster fisheries are the largest fisheries in the action area, with participants numbering in the tens of thousands rather than the twenties as for directed herring vessels, the potential for interaction with this gear sector may be significant. However, the degree to which that interaction might result in serious injury or mortality of whales, sea turtles, or sturgeon is unknown. Since bait nets are typically shorter than full-scale gillnets used in fisheries such as the sink gillnet fisheries for groundfish, any lethal takes that might occur are more likely to involve smaller animals.

Several types of gillnet gear, including pelagic drift gillnets, anchored pelagic gillnets, and anchored sink gillnets, have been used historically in the herring fishery. Although mesh size of gillnets may play a significant role in bycatch of finfish, available information suggests that mesh size is not as important relative to marine mammal or sea turtle entanglement in the gillnet gear type as a whole, particularly since both whales and sea turtles are known to become entangled in buoy lines as well as in the nets themselves. Entanglements of right, humpback, and sperm whales have been reported in small mesh gillnet gear.

Trawl gear: Interactions between herring trawl gear and listed species are most likely to involve sea turtles. Entanglement of sea turtles has been reported for both midwater (including pair trawl) and bottom trawl gear. Due to the increased fishing power of pair trawlers, entanglement in gear used by this sector of the fishery may be more likely. Based on observations of the tuna fisheries, both lethal and non-lethal takes of leatherback turtles are known to occur in pair trawl gear. Entanglement of small cetaceans and pinnipeds has been documented in trawl fisheries for pelagic finfish in both the eastern and western Atlantic Ocean (Couperus 1997, Fertl and Leatherwood 1997, Morizur *et al.* 1997, Waring *et al.* 1990, Waring *et al.* 1999). Entanglement in trawl gear has been reported historically for some whales. However, available information suggests that interactions between whales and herring trawls are likely to be rare occurrences and would be more likely to involve rigging cables than the nets themselves. Discussion by fishermen at various NEFMC committee meetings suggests that herring trawl vessels are likely to use a slower towing speed than trawl vessels targeting other finfish species such as mackerel because herring are slower swimmers — and would therefore not be as likely to capture protected species. However, no data on differential bycatch patterns relative to tow speed is available to support this theory.

Purse seine gear: Of the primary mobile gear types used in the herring fishery, purse seine gear is most likely to interact with endangered whales. Based on observations of humpback whales encircled by bluefin tuna purse seine vessels, it is possible to release whales from a purse seine without apparent injury. Although entanglement in the lines or mesh of a purse seine is possible, whales are less likely to become entangled in the mesh of a purse seine than in monofilament gillnet gear.

The internal metabolic effects of stress resulting from encirclement of small cetaceans in tuna purse seine gear in the Eastern Tropical Pacific has been identified as a major concern. No evidence of this problem has been found for endangered whales in the Atlantic tuna purse seine fisheries. Although stress effects are possible for whales, behavior of these species relative to small cetaceans suggests that the internal effects of stress due to encirclement are likely to be less for baleen whales than for small cetaceans or other odontocetes.

Attraction to harvesting and processing: any interactions that do occur in the herring fishery may be exacerbated by the element of attraction to harvesting or processing operations. Attraction of predators to fishing activities, otherwise known as the "dinner bell effect", has been identified as a concern for several fisheries. Predators can be attracted by the bait or the catch. This behavior has been implicated in the bottom longline fishery in Alaska and in the pelagic longline fishery in the Atlantic. In certain circumstances, fishing activity can make prey more accessible to marine mammals and birds by concentrating the target species, scattering injured fish, or bringing fish up to depths where they are accessible. The amount of activity at or near the surface during the haulback and transfer processes may have been a factor in the incidental take of small cetaceans observed in the foreign/joint venture squid and mackerel trawl fisheries in the 1970s and 1980s (Waring, pers. comm.). The lengthy time of towing nets at the surface during the process of transferring the codend to the processing vesssel is not likely to occur in the herring fishery, where most of the transfer of catch is currently conducted through a pump-out process rather than codend transfer. Thus, attraction effects in the herring fishery are more likely

to involve harvesting activities. This behavior was observed in the Maine DMR study discussed above. In some instances, smaller whales were apparently feeding on discarded catch and following herring vessels (Stevenson and Scully 1999; D. Stevenson, pers. comm.). Surface activity may encompass a greater period of time for pair trawl vessels than for single vessels. Sea turtles may be attracted to fixed gear such as anchored gillnets set for herring, and some depredation of the catch may occur.

Vessel Effects

Potential adverse effects of fishing vessel operations (other than entanglement in fishing gear) are discussed in the Environmental Baseline section above. There is no information available that would suggest that vessels associated with the proposed herring fishery are likely to adversely affect threatened or endangered species in the area of the proposed fishery. Although such effects are possible, the best scientific and commercial information available for this consultation leads NMFS to conclude these effects are not likely.

C. Trophic Interactions: Competition with the Herring Fishery and the Herring Resource

The availability of sufficient prey for endangered whales may be affected through competition with the herring fishery or with the herring resource. The two types of potential trophic interactions include a) competition for herring between piscivorous whales and the herring fishery and b) competition for zooplankton between planktivorous whales and Atlantic herring. Habitat requirements for the endangered whales have been studied but remain largely unknown. Competition with fisheries and perturbations of the prey resource base have been discussed, and some facets of the problem have been studied. However, the complexity of ecosystem interactions and logistical difficulties of conducting necessary sampling have hindered conclusive demonstration of the existence of competition. The effects of competition on survival and recovery are particularly difficult to demonstrate conclusively due to the number of other factors which can affect population performance.

If an important whale prey resource becomes unavailable, then at a minimum a redistribution of whales would be expected, a more substantial effect would be a decrease in the rate of recovery, and the extreme effect would be extinction of the whale species. Several attempts have been made to investigate the potential for interspecific competition and its ramifications for baleen whale species in various ecosystems. These discussions seem to suggest that indirect competition may occur, but that resource partitioning is more likely. However, resource partitioning in the Northeast Shelf ecosystem would have evolved prior to human exploitation of whale resources or fishery resources. Thus true resource partitioning may no longer exist, particularly with regard to a single prey species, and competition might be a factor in determining the availability of prey resources in the current ecosystem. Even if competition does exist, however, it may not necessarily be affecting recovery of whale populations. Clapham and Brownell (1996) concluded that data are not available to evaluate the effect of potential competition on recovery.

Competition for Herring

The herring fishery and humpback/fin whales are both targeting herring, so there is some degree of niche overlap. The degree to which whales are dependent upon the herring resource is unknown. Payne *et al.* (1990) discussed the redistribution of several baleen whale species subsequent to the collapse of the herring stock and increase in the sand lance stock. As noted earlier, some degree of spatial and temporal overlap exists between humpback/fin whales and the herring fishery. The temporal overlap apparently includes some overlap in seasonal abundance as well as time of day during which harvest of herring occurs. The vertical migration behavior of herring may make this species more available to both whales and the fishery at night. Based on data 1978-1988 whale distribution data and 1997 fishing effort data, it is likely that the overlap for both humpback and fin whales would be greatest in the Gulf of Maine from April through November and for fin whales in July on Georges Bank.

The potential for competition between the herring fishery and humpback/fin whales is dependent upon whether the whales are actually limited by the amount of herring available. Although food-limitation has been theorized, it has not been conclusively documented. Food-limitation has been proposed as a potential cause for the high mortality rate of gray whales in the Eastern Pacific thus far in 1999. Inter-annual distribution of whales in the Atlantic has apparently been affected by the herring fishery. However, no information is available to determine whether survival and recovery of individual humpback or fin whales has been affected by the herring fishery. The feeding stock of humpback whales in the action area has continued to recover at least through 1991, but the influence of the herring fishery on the rate of recovery is unknown. Trend information is not available for fin whales. Further study is needed to establish a baseline for essential prey requirements for baleen whales and other herring predators. This information would facilitate a determination of the degree to which fluctuations in local or regional abundance of primary prey species has affected the vital rates of individual whales, feeding stocks, or populations.

Competition for Zooplankton

Distribution of planktivorous whales may be influenced by competition for zooplankton resources with planktivorous fish. Insufficient information is available at this time to draw conclusions regarding adverse effects of the herring fishery on the recovery of endangered planktivorous whale populations.

Influence on Entanglement Rates

If competition with fisheries results in re-distribution of whales, entanglement patterns may change. For example, if whales move into an area not normally used due to depletion of prey resources in another area, entanglement rates in certain fisheries in the new areas may increase. This pattern was observed with whales in Newfoundland in relation to the capelin fishery (Lien *et al.* 1979, Whitehead and Carscadden 1985) and may have occurred with harbor porpoise as a result of the Georges Bank herring fishery (Kenney *et al.* 1996).

D. Effects of the Herring Management Measures

The conversion of the herring fishery into a regulated fishery will benefit protected species management by the overall monitoring of effort patterns in the fishery and designation of area-based TACs established based on the health of the resource in those areas. The FMP includes a provision for a 5-year rebuilding program if monitoring efforts determine that stock parameters and fishing mortality reach critical levels.

Harvest Capacity Restrictions

The relationship between fishing power and rates of entanglement of various protected species is poorly understood. Factors such as the towing speed, dimensions of net openings, depth in the water column, time of day, length of haulback process, and duration of transfer activity at the surface may affect entanglement rates. If vessels with higher harvest capacity are more likely to take sea turtles, then restrictions on the fishing power will benefit these species. Further information on vessel characteristics and fishing strategies may be obtained from proposed conservation recommendations.

Spawning Closures

The incorporation of spawning closures into the proposed action may be critical to the health of the herring resource and its persistence as a whale prey species. Anthony and Waring (1980) suggest that the collapse of the Georges Bank herring stock may have been due to a systematic overfishing of the various spawning areas. Although it has not been conclusively demonstrated that humpback and fin whales target spawning herring, the proposed timing of the spawning closures overlaps the use of the areas by whales. Therefore, some benefit to these species is likely to occur. Due to the potential for effort shifts inherent in closure actions, any adverse effects of the fishery could be amplified during the times right before and after spawning closures and in areas outside the boundaries of these closures. The efficacy of spawning closures could be affected by the 2,000 lbs/day incidental catch allowance for other fisheries.

Time/Area Closures

Although no closures for reduction of fishing effort or bycatch, including bycatch of protected species, are necessary at this time, the FMP incorporates a mechanism to implement time/area closures for reduction of bycatch of protected species when appropriate. This will facilitate fast action should closures become necessary.

Supporting Administrative Measures

The majority of supporting administrative measures are not expected to affect protected species. Some measures may have a beneficial impact on protected species management. The requirement for vessels participating in the herring fishery to obtain a permit and comply with mandatory data reporting and observer requirements will facilitate monitoring of effort and its impact on protected species and critical habitat. This provision will monitor fishing pressure, which was

rising, to ensure that the stock does not become overfished again. Timely reporting will be particularly important due to the harvesting capacity of some sectors of the fleet.

E. Summary

Implementation of the Atlantic Herring FMP is expected to benefit threatened and endangered species that rely on herring as a prey resource by imposing a regulatory framework on the current fishery. This is particularly important in the Gulf of Maine, where the herring resource is considered to be fully exploited.

The herring fishery has apparently affected the distribution of piscivorous endangered whales and might indirectly affect the distribution of planktivorous whales. The shift in distribution might indirectly lead to other adverse impacts such as increased rates of entanglement in fixed gear. However, adverse effects of competition with the fishery have not yet been demonstrated and cannot be measured at this time. Effects may be most pronounced, and therefore most easily observed, in the Gulf of Maine and in spawning areas. In order to assess future impacts of the fishery, it is critical that research be conducted to determine the essential habitat requirements and patterns of habitat use for endangered whales. In addition, the development of ecosystem models would facilitate the prediction of impacts of fluctuations in the various predator and prey species with which endangered whales interact.

While NMFS' sea sampling program has provided no evidence of listed species being taken in the herring fishery, actual monitoring of the herring fishery is minimal and the degree to which existing coverage has tracked the current fishery or incidental take patterns is unknown. Nevertheless, based on prior experience with other fisheries, it is reasonable to expect threatened and endangered species of whales and sea turtles to become entangled in gear authorized for the federal herring fishery. Although there are no specific data available that can be used to estimate the number of threatened or endangered species that might be taken in herring gear; nevertheless, based on takes estimated from Sea Sampling data for gear types which may be used in the herring fishery, NMFS believes it would be reasonable to expect 6 loggerhead sea turtles to be taken by the proposed fishery (3 of these takes would be lethal) and 1 green sea turtle, Kemp's ridley sea turtle, and leatherback sea turtle to be taken by the proposed fishery.

Using the information available on the proposed herring fishery, NMFS cannot determine if those entanglements would seriously injure or kill threatened or endangered species. Based on the information available on the distribution and abundance of these sea turtle species in the action area, NMFS does not believe the death, capture, or injury of these small numbers of sea turtles would appreciably diminish the viability of sea turtle populations in the action area. Further, NMFS does not believe it would be reasonable to expect the death, capture, harm, or harassment of these numbers of sea turtles would appreciably reduce the likelihood of survival and recovery or these species in the wild.

Although endangered shortnose sturgeon occur in the action area for the proposed action, it would not be reasonable to expect the proposed herring fishery to appreciably reduce the

likelihood of the sturgeon's survival and recovery in the wild because sturgeon are limited to the rivers, estuaries, and nearshore waters of the action area.

CUMULATIVE EFFECTS

"Cumulative Effects," as defined in the ESA, are "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Therefore, this section does not discuss the cumulative effects of federal actions since these actions undergo section 7 consultations.

Commercial fishing activities in state waters are likely to take several protected species. However, it is not clear to what extent state-water fisheries may affect listed species differently than the same fisheries operating in federal waters. Further discussion on state water fisheries is contained in the Environmental Baseline section. The Atlantic Coastal Cooperative Statistics Program (ACCSP), when implemented, is expected to provide information on takes of protected species in state fisheries and systematically collected fishing effort data which will be useful in monitoring impacts of the fisheries.

Ship strikes have been identified as a significant source of mortality to the northern right whale population (Kraus 1990) and are also known to impact all other endangered whales. Small vessel traffic is also known to take sea turtles. Commercial shipping traffic in the action area is estimated at 1,200 ship crossings per year with an average of three per day. In one region of the action area, about 20 whale watch companies representing 40 to 50 boats conduct several thousand trips from April through September, with the majority of effort in the summer season. In addition, an unknown number of private recreational boaters frequent coastal waters; some of these are engaged in whale watching or sportfishing activities. These activities have the potential to result in lethal (through entanglement or boat strike) or non-lethal (through harassment) takes of listed species that could prevent or slow a species' recovery. Effects of harassment or disturbance which may be caused by whale watch operations are currently unknown. Various initiatives have been planned or undertaken to expand or establish high-speed watercraft service in the northwest Atlantic, including one service between Bar Harbor, Maine, and Nova Scotia with a vessel operating at higher speeds than established watercraft service. The Bar Harbor-Nova Scotia high speed ferry conducted its first season of operations in 1998. The operations of these vessels and other high-speed craft may adversely affect threatened and endangered whales and sea turtles, as discussed previously with private and commercial vessel traffic in the Action Area. NMFS and other member agencies of the Northeast Implementation Team will continue to monitor the development of the high speed vessel industry and its potential threats to listed species and critical habitat.

Sources of pollutants in the Gulf of Maine and other coastal regions include atmospheric loading of pollutants such as PCBs, storm water runoff from coastal towns, cities and villages, runoff into rivers emptying into the bays, groundwater discharges and river input and runoff. Nutrient loading from land based sources such as coastal community discharges is known to stimulate plankton blooms in closed or semi-closed estuarine systems. The effects to larger embayments is unknown.

CONCLUSION

After reviewing the best available information on the status of endangered and threatened species under NMFS jurisdiction, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is NMFS' Biological Opinion that the operation of the federal Atlantic Herring fishery under the proposed FMP may adversely affect but is not likely to jeopardize the continued existence of the northern right whale, humpback whale, fin whale, blue whale, sei whale, sperm whale, loggerhead sea turtle, leatherback sea turtle, Kemp's ridley sea turtle, green sea turtle or shortnose sturgeon. It is also NMFS' biological opinion that prosecution of the proposed herring fishery is not likely to destroy or adversely modify critical habitat designated for the northern right whale.

INCIDENTAL TAKE STATEMENT

Section 9 of the Endangered Species Act and federal regulations pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and not the purpose of, the execution of an otherwise lawful activity. Under the terms of Sections 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement (ITS).

The measures described below are non-discretionary and must be undertaken by NMFS in a manner that they become binding conditions so that the exemption in section 7(o)(2) will apply. NMFS has a continuing duty to regulate the activity covered by this ITS. If NMFS fails to assume and implement the terms and conditions through enforceable terms, the protective coverage of section 7(o)(2) may lapse.

When a proposed NMFS action which may incidentally take individuals of a listed species is found to be consistent with section 7(a)(2) of the ESA, section 7(b)(4) of the ESA requires NMFS to issue a statement specifying the impact of any incidental taking. It also states that reasonable and prudent measures necessary to minimize such impacts be provided along with implementing terms and conditions. Only those incidental takes resulting from the agency action (including those caused by activities approved by the agency) that are identified in this statement and are in compliance with the specified reasonable and prudent alternatives and terms and conditions are exempt from the takings prohibition of Section 9(a), pursuant to section 7(o) of the ESA.

Until negligible impact findings and small take authorizations are issued under Section 101(a)(5)(E) of the MMPA, no takes of listed marine mammals will be authorized through this Biological Opinion. Following issuance of such regulations or authorizations, NMFS may amend this Biological Opinion to include an incidental take allowance for these species, as appropriate.

Anticipated Amount or Extent of Incidental Take

NMFS anticipates that the operation of the federal Atlantic Herring fishery under the proposed FMP may result in the injury or mortality of loggerhead, leatherback, green, and/or Kemp's ridley sea turtles. Based on observed takes from Sea Sampling data for gear types which may be used in the herring fishery, NMFS anticipates that the following numbers of incidental takes of sea turtles may be observed annually:

- 6 takes (no more than 3 lethal) of loggerhead sea turtles,
- 1 lethal or non-lethal take of green sea turtles,
- 1 lethal or non-lethal take of Kemp's ridley sea turtles, and/or
- 1 lethal or non-lethal take of leatherback sea turtles.

Anticipated Impact of Incidental Take

The accompanying Biological Opinion evaluated the effects of this level of take on these threatened and endangered species. has determined that this level of anticipated take is not likely to result in jeopardy to the species.

Reasonable and Prudent Measures

NMFS has determined that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of sea turtles:

1. For each gear type used in the herring fishery, NMFS shall continue to analyze all available data to determine the annual level of incidental take of sea turtles. NMFS shall prepare a report analyzing existing data, providing estimated levels of take by species, gear type, location, and month and discussing any statistical or other scientific shortcomings of those data. Semi-annual (at least quarterly, monthly if possible) reports shall be prepared listing numbers of observed takes. Annual reports shall be prepared to summarize all available bycatch information throughout the species' range to facilitate cumulative impact monitoring. Beginning in 2000, reports should be finalized by September 1 of each year.

2. To evaluate the impact of any incidental take that does occur, NMFS must assign staff to monitor and implement the ITS. Assistance may be requested from non-NMFS scientists or individuals with other technical expertise as appropriate. The panel will evaluate the annual bycatch and mortality report in Item 1 above to determine whether the incidental take level should be modified or if other management measures must be implemented to reduce take levels. To the full extent possible, this monitoring should be conducted in the context of cumulative monitoring of all known take sources. Beginning in 2001, an annual report summarizing take data and progress of take reduction measures shall be submitted to the Director, Office of Protected Resources by January 1 of each year.

a. If, during the course of any one year, NMFS determines that the ITS has been or is likely to be exceeded, this information should be provided to the monitoring panel for immediate review and necessary action. A report summarizing the panel's findings shall be submitted to the Regional Administrator within 30 days. Upon receipt of the panel report, NMFS must review the need for possible modification of the reasonable and prudent measures or other appropriate action in the context of reinitiation of consultation.

3. NMFS must work with the ASMFC to ensure that planned reporting of sea turtle and shortnose sturgeon takes into the Atlantic Coastal States Cooperative Statistics Program is implemented. Reporting information must provide adequate identification guidance for both sea turtles and shortnose sturgeon. Takes must be reported within 48 hours of returning from a trip in which an incidental take occurred. The reports shall include a description of the animal's condition at the time of release. NMFS shall consider incorporating this reporting requirement into the FMP.

4. NMFS must provide adequate guidance such that any sea turtle incidentally taken will be handled with due care, observed for activity, and returned to the water. NMFS will send a letter to all herring permit holders detailing protocol for handling a turtle interaction. This letter must include the following measures, which are provided in 50 CFR Part 227.72(e)(1)(I):

   a. Live animals must be handled with care and released as soon as possible without further injury.

   b. Animals are to be released when the vessel is in neutral and only in areas where they are unlikely to be recaptured or injured by vessels.

   c. Comatose sea turtles should be resuscitated according to the procedures set forth in 50 CFR 227.72 (e)(1)(I).

   d. Dead sea turtles may not be consumed, sold, landed, offloaded, transshipped or kept below deck, but must be released over the stern of the vessel.

NMFS anticipates that not more than 6 loggerhead sea turtles or one green sea turtle, Kemp's ridley sea turtle, or leatherback sea turtle will be incidentally taken in any given year as a result of the federal herring fishery managed under the proposed FMP. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might result from the proposed action. If, during the course of the herring fishery, this level of incidental take is exceeded, the additional level of take would represent new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided above.

CONSERVATION RECOMMENDATIONS

In addition to section 7(a)(2), which requires agencies to ensure that proposed projects will not jeopardize the continued existence of listed species, section 7(a)(1) of the ESA places a responsibility on all federal agencies to "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species". Conservation Recommendations are discretionary activities designed to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The conservation actions related to whale entanglement which were recommended in the Recovery Plans for the right and humpback whales are implemented in the ALWTRP and are incorporated by reference. The ALWTRP should also provide some benefit to other endangered whales and to sea turtles. The following additional measures are recommended regarding incidental take, whale prey resources, and sea turtle conservation:

A. Annual Monitoring of Takes of Protected Species in the Herring Fishery

1. Although takes of listed species other than sea turtles are not authorized at this time, annual reports prepared for sea turtles should also include information on incidental take of other protected species including fish, whales, and marine birds. Takes of all protected resources should be reported to the New England Fishery Management Council for inclusion in the annual Stock Assessment and Fishery Evaluation (SAFE) report. The SAFE report will be made available to the public and will be used by the Council to design management measures for the next fishing year. When the ACCSP information becomes available, efforts should be made to incorporate information on incidental take in state fisheries.

B. Whale prey resources in relation to population status and trends.

1. Due to the importance of Atlantic herring as a prey resource for piscivorous endangered whales and related trophic effects, NMFS should evaluate available information and identify research necessary to identify habitat requirements and foraging strategies of endangered whales. An understanding of the habitat requirements will facilitate analysis of potential for competition between the whales and commercial fisheries targeting the same prey resources.

C. Sea turtle conservation.

1. NMFS should continue to pursue efforts to work with states to develop Section 10 permits and associated conservation plans that improve data collection regarding the incidental take of sea turtles and reduction of takes.

2. NMFS, in conjunction with the ASMFC or other appropriate regulatory authority, should encourage states to require fishermen to report sea turtle takes as bycatch in any

mandatory state logbooks and should provide instructions on release. Reports should include a description of the animal's condition at the time of release.

3. A significant amount of ghost gear is generated from fixed gear fisheries, occasionally due to conflict with mobile gear fisheries, other vessel traffic, storms, or oceanographic conditions. There is potential that this gear could adversely affect both sea turtles and their habitat. In order to minimize the risks associated with ghost gear, NMFS should assist the USCG in notifying all Atlantic fisheries permit holders of importance of bringing gear back to shore to be discarded properly. In conjunction with the USCG, fishery councils/commissions, and other appropriate parties, NMFS should review current regulations that concern fishing gear or fishing practices that may increase or decrease the amount of ghost gear to determine where action is necessary to minimize impacts of ghost gear. NMFS should assist the USCG in developing and implementing a program to encourage fishing industry and other marine operators to bring ghost gear in to port for re-use and recycling. In order to maximize effectiveness of gear marking programs, NMFS should work with the USCG and fishery councils/commissions to develop and implement a lost gear reporting system to tie in with ghost gear program and consider incorporating this system into future revisions of the appropriate management plans.

4. To facilitate investigation of behavioral interactions related to incidental take, NMFS should determine the feasibility of underwater observation of the various herring fishing activities, including use of ROVs if necessary. This information should be compared with any existing observations of capture of sea turtles, marine mammals, or marine birds.

REINITIATION OF CONSULTATION

This concludes formal consultation on the proposed federal herring fishery as managed under the proposed Atlantic Herring FMP. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) a new species is listed or critical habitat designated that may be affected by the action; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered. (Specifically, should new information on herring biology and whale prey requirements suggest that the levels of prey resources required by endangered whales may be compromised by herring fishing mortality, consultation should be reinitiated). In instances where the amount or extent of incidental take is exceeded, NMFS must immediately reinitiate formal consultation.

Because of the FMP adjustment process, it is anticipated that consultation on the Atlantic Herring FMP will be reinitiated at least annually as new management measures are developed. Each reinitiation will consider all aspects of the fishery and the FMP. NMFS is currently conducting a comprehensive bycatch analysis which is expected to be available by the end of calendar year 1999. In addition to information on bycatch, this analysis will also represent an

important source of distributional information for sea turtles in the action area. NMFS believes this report may constitute new information that reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this Biological Opinion.

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